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EUPHORBIA SUBGENUS CHAMAESYCE IN CANADA AND THE UNITED STATES EXCLUSIVE OF SOUTHERN FLORIDA

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(Plates 654–668)

INTRODUCTION

From an early curiosity about the peculiar “flower” of *Euphorbia*, the writer’s interest developed into a serious study of the genus, which soon led to the realization that not only was the structure of the “flower” involved but that the classification of the genus was in a remarkable state of confusion. Boissier in DC. Prod. **15** (2): 3–188. 1862, published the first revision of the entire genus since Linnaeus’ time. Since 1862 the number of species of *Euphorbia* published has about doubled. Whereas Boissier recognized about seven hundred species as valid, Pax & Hoffmann in Engler & Prantl, Nat. Pflanzenfam. 2 Aufl., **19c.**: 209. 1931, *guess* that there are about one thousand six hundred species. With this great increase since an organized treatment of the genus the need of taxonomic revision is evident.

I. GENERAL DISCUSSION

HISTORY

The following remarks apply only to the subgenus *Chamaesyce* except where expressly stated to be of broader scope. Wiman, in Linnaeus, Amoen. Acad. **3**: 102. 1756, lists *Chamaesyce* as a

synonym of *Euphorbia*. S. F. Gray, Nat. Arr. Brit. Pl. **2**: 260. 1821, in describing *Chamaesyce* as a genus, credits it to Dioscorides. Thus it is evident, if Gray's interpretation was correct, that the group was recognized in antiquity. Persoon, Syn. Pl. **2**: 12. 1806,¹ used *Chamaesyce* as a synonym of a defined but unnamed subdivision, of subgeneric rank, of *Euphorbia*. Rafinesque, Amer. Mo. Mag. **2**: 119. 1817, independently published *Chamaesyce* as a subgenus. Haworth, Syn. Pl. Succ., 159. 1812, proposed the genus *Anisophyllum* for the same entity but the name was preoccupied. Quite independently, Duby in A. P. DeCandolle, Botanicon Gallicum ed. 2, **1**: 412. 1828, took up the formerly unpublished *Euphorbia* section *Anisophyllum* of Roeper. Authors who have assumed that nomenclaturally this was based on *Anisophyllum* Haworth would do well to note this point. This sort of confusion of the independent use of the same name in either the same or different categories by different authors is common under *Euphorbia* and the genera segregated from it. This is due to the fact that many of these names are either traditional, as *Chamaesyce*, or suggested by some striking characteristic of the group, as *Anisophyllum*. For the more detailed history of the uses of the name applicable to this subgenus see beyond under the taxonomic section.

The workers who have made the principal contribution to our knowledge of *Euphorbia* subgenus *Chamaesyce* in the area under consideration are Boissier, George Engelmann, Millspaugh, and Small. Boissier revised the entire genus *Euphorbia* in 1862. Engelmann described many of the species discovered in the United States. Millspaugh's contribution was mainly new species, a multitude of new combinations, and the accumulation of invaluable fragments of types. His work is notable for the number of worthless new species that he proposed. Small either contributed the actual text for several of the principal floras of the region, or exerted a strong influence, as in the case of Rydberg's works.

My own publications relating wholly or partly to *Euphorbia* subgenus *Chamaesyce* are listed in the bibliography at the end of this section (pp. 106 and 107).

¹ As noted by Blake, RHODORA 17: 134, footnote 1. 1915, pages 1-277 of "pars secunda" of Persoon's Synopsis Plantarum were published in 1806, as shown by the review of these pages in Botanische Zeitung, Regensburg 5: 321. 1806 (Nov. 15).

MORPHOLOGY

ROOTS: The lateral roots are ordinarily slender and branching in the manner common in small annual and perennial herbs. Occasionally the taproots become thickened and even subfarinaceous. Certain of the longer-lived perennials often develop buds well beneath the surface of the ground and the stems arise beneath the ground and come to the surface more or less scattered instead of originating from a common point at the surface.

STEMS: The stems ordinarily have an interrupted main axis. After the first pair of primary leaves the main axis ceases to elongate. Lateral branches arise from the apex without any particular relation to the leaves. In species developing a single erect stem one branch only arises or, if more than one, then one soon dominates. If this stem attains any appreciable diameter the interruption of the main axis becomes completely concealed in the manner illustrated by Croizat in Degener, Fl. Hawaii, fam. 190, *Chamaesyce*₂₋₃. 1937. Whether this type of axial growth obtains in *Euphorbia gracillima* and *revoluta* is uncertain from herbarium specimens.

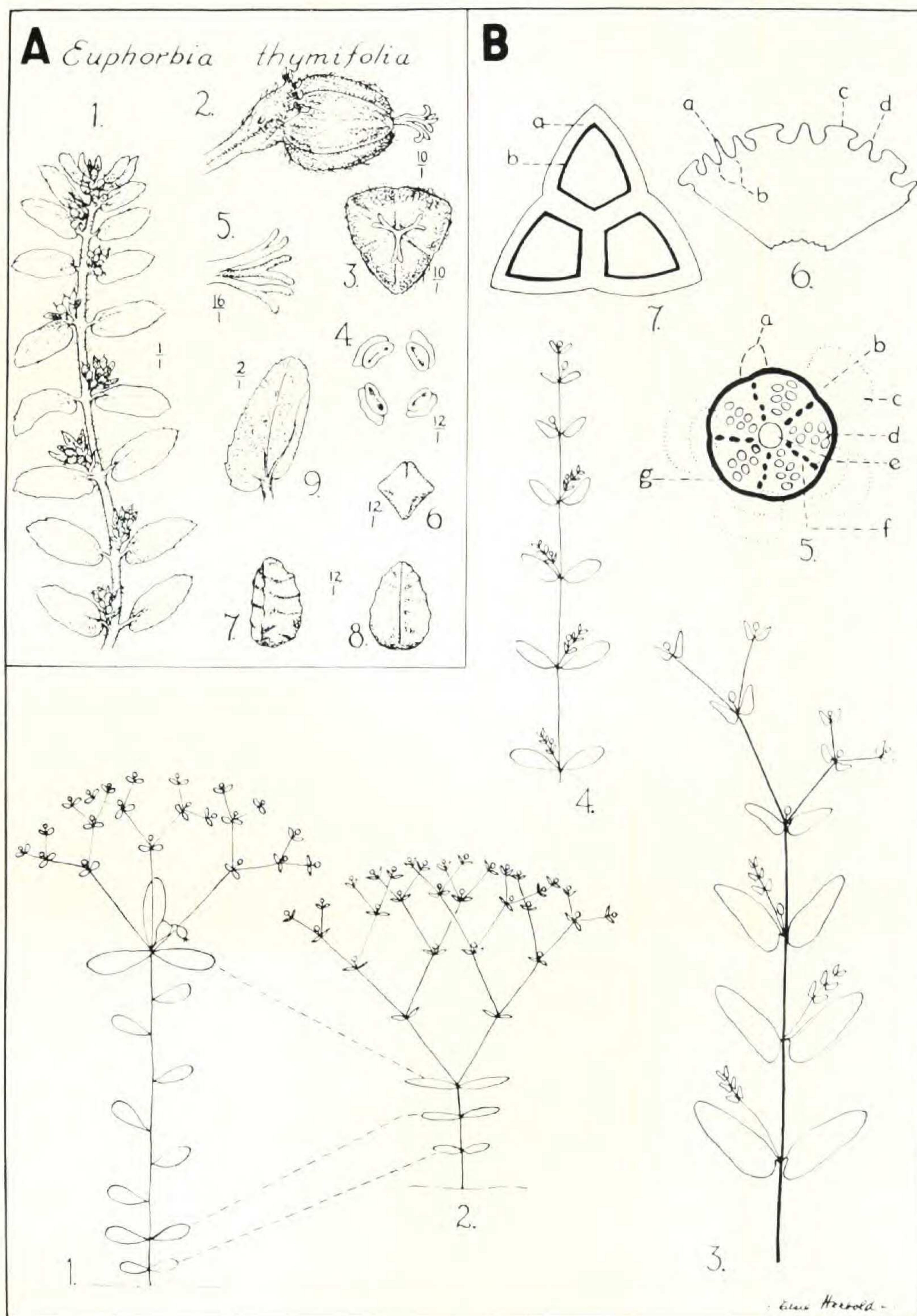
The origin of this type of branching was first suggested by Roeper, Enum. Euph., 30. 1824. He suggested that the branches arising from the crown of the main stem in subgenus *Chamaesyce* were homologous with the rays of the pleiochasium of *Euphorbia* subgenus *Esula* Pers. (*Euphorbia* sect. *Tithymalus*). This seems to be a very reasonable explanation. It is only necessary to add that, whereas the main axis in subg. *Esula* is terminated by a cyathium, in subg. *Chamaesyce* it is not. This would seem to be a fundamental difference but it is not. When by progressive reduction of the main axis subg. *Chamaesyce* finally arrived at the habit of branching after the first pair of true leaves appeared, the plant was obviously too small to produce all the elaborated food necessary for the production of a cyathium with its reproductive structures requiring abundant protein, fats, and carbohydrates; so we find that the cyathium which would otherwise terminate the main axis is omitted.

The often apparently lateral type of branching of the stems of subgenus *Chamaesyce* appears to differ from the plainly dichotomous or sometimes trichotomous type of the rays of subgenus *Esula*. But Roeper was equal to this difficulty. While poten-

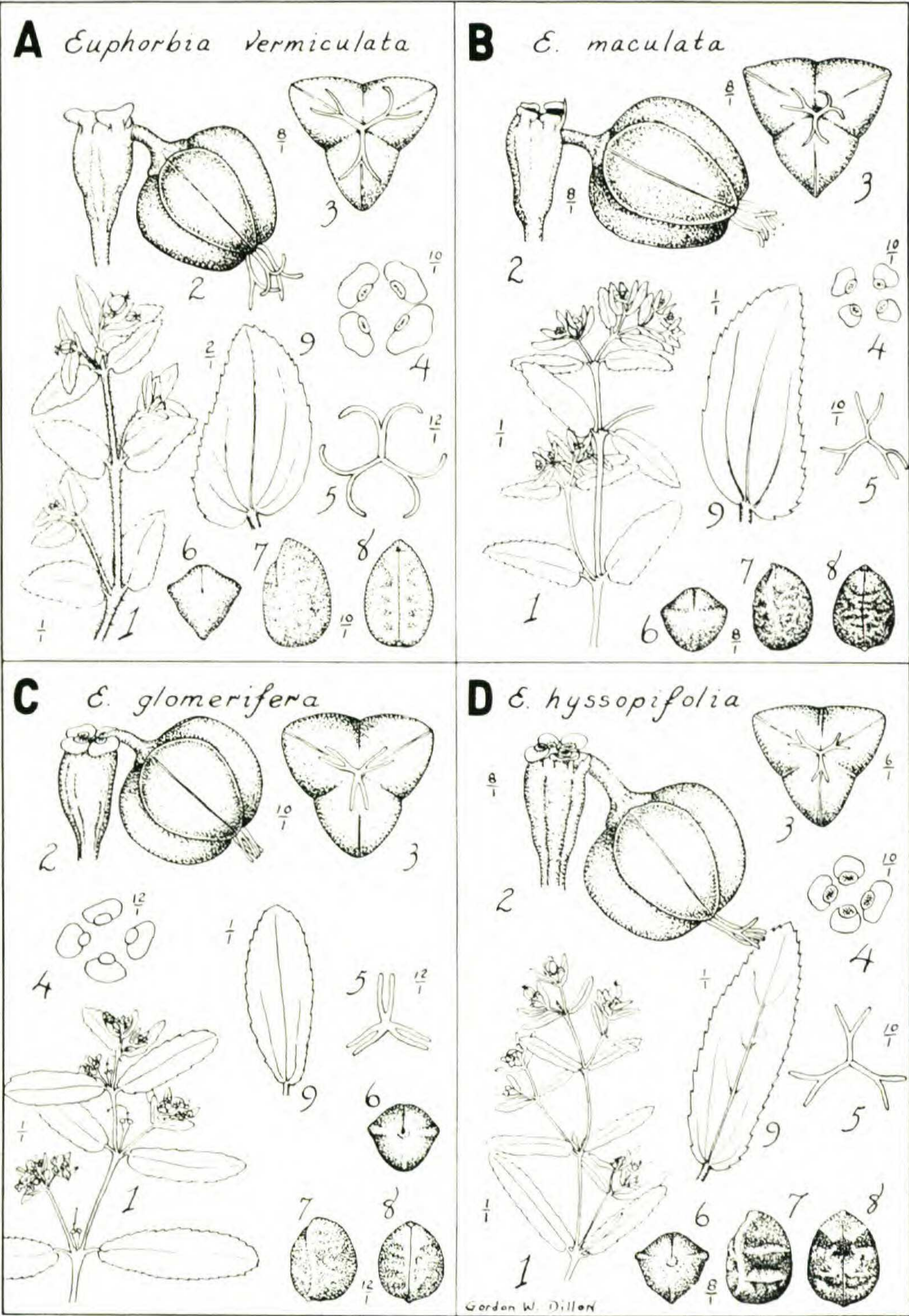
tially dichotomous, the branching in subg. *Chamaesyce* often, by reduction, becomes apparently ordinary lateral branching though it is really sympodial as shown by the position of the cyathia. But in species with this type of branching the stem-tips often exhibit symmetrical dichotomy with actually terminal cyathia. All the cyathia are morphologically terminal even though they appear axillary when the suppressed branch of the scorpioid sympodium is absent. Collateral branching, i. e., subsidiary branching in addition to the main and more or less suppressed branches of the dichotomy, is common.

PLATE 655B, FIGS. 1-4, shows a possible reductional series from a member of either *Euphorbia* subg. *Esula* or *Agaloma*. FIG. 1 represents the ancestral type with stem-leaves alternate between the whorled leaves subtending the terminal pleiochasium and the first pair of true leaves. Both *E. Peplus* L. (subg. *Esula*), and *E. marginata* Pursh (subg. *Agaloma*) have this habit. The cotyledons are represented by the lowermost pair of lateral outgrowths of the stem. FIG. 2 shows the apparent type of axial growth of *E. gracillima* S. Wats. and *E. revoluta* Engelm. (subg. *Chamaesyce*). Whether this is actually the type of growth obtaining in these two species awaits confirmatory study of their seedlings. In any event, the type of axial growth shown in FIG. 2 represents a plausible intermediate between FIG. 1 and the type commonly found in subg. *Chamaesyce*. FIG. 3 is a diagrammatic representation of a branch of *E. maculata* L. showing the easy transition from a sympodium below to a subsymmetrical dichotomy at the apex. FIG. 4 shows a branch of the sort commonly found in members of subg. *Chamaesyce*, e. g. *E. supina* Raf. Here is shown the gradual suppression of alternate branches of the dichotomy until there is derived a scorpioid sympodium simulating an ordinary monopodium. In prostrate species such as *E. supina* the branches radiate from the sides of the short main axis. Whereas in FIG. 2 the distance from the cotyledons to the first pair of true leaves is represented as about 1 cm., in more reduced species, as *E. supina*, it is of the order of a millimeter. Conclusion: The branches of members of subg. *Chamaesyce* are homologous with the pleiochasial rays of members of subgenera *Esula* and *Agaloma*.

Whether subgenera *Agaloma* and *Chamaesyce* are independent



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developments from subgenus *Esula*, or subg. *Esula* gave rise to subg. *Agaloma*, and that in turn to subg. *Chamaesyce*, or subg. *Agaloma* gave rise to two independent lines represented by subgenera *Esula* and *Chamaesyce*, is an obscure question which will occupy the attention of phylogenetic speculators for many unprofitable hours. Some members of *Euphorbia* subg. *Agaloma*, e. g. *E. marginata* Pursh and *E. corollata* L., have a pleiochasial inflorescence, and similar species, rather than any members of subg. *Esula*, may be the ancestors of subg. *Chamaesyce*, though the occurrence of subg. *Agaloma* only in the New World, as contrasted with the occurrence of subg. *Chamaesyce* on all continents, suggests that such ancestry is improbable.

LEAVES: The leaves are simple, thin to thick. The margin is entire to variously toothed. The base is usually markedly inequilateral. The leaves, when sufficiently thin, exhibit a curiously mottled appearance when viewed by transmitted light. The venation is reticulate and the chlorophylliferous cells, instead of being distributed in the usual manner, are around the veinlets, thus leaving clear areas between. Veh, Ann. Jard. Buit. **38**: T. XV, figs. 32–34. 1928, illustrates this.

STIPULES: The stipules are small, variously membranous, lacerate, connate, or distinct.

VESTITURE: The trichomes, which constitute the only vestiture, are always simple. Most of them, unless very short, are multicellular, with the cells end to end. Occasionally, as in *Euphorbia hirta*, the distinction in size between hairs and capillary multiseriate segments disappears. Some of the divisions of the involueral lobes in *E. hirta* are no thicker than the trichomes on the lobes. The walls of the hairs are usually microscopically rugulose. In a few species such as *E. arizonica* and *setiloba* the cell-wall is quite smooth.

CYATHIA: The cyathia are compound inflorescences simulating simple flowers yet consisting of few to numerous staminate flowers and a central pistillate flower, these surrounded by a cuplike involucre composed of commonly five foliar structures united by their margins. Alternating with the tips (lobes of the involucre) of these modified leaves are nectariferous glands. Each gland is supplied by two traces, one from each of the adjacent modified leaves. The glands often bear petaloid append-

ages. Usually one of the glands is missing and the pistillate pedicel is commonly deflexed into the interval thus created. PLATE 655B, FIGS. 5 and 6, illustrate the structure of the cyathium and involucre.

The voluminous literature relating to the interpretation of the cyathium can be found by examining the bibliographies given by Pax 1884, Schmidt 1906, Denis 1921, Haber 1925, Bodmann 1937, and Schoute 1937.

The staminate flowers are pedicellate, naked and monandrous. Each staminate flower is primitively subtended by a bracteole. These bracteoles may be entirely free but are generally more or less connate and often adnate below to the involucre. The staminate pedicels are termed androphores in this paper.

The pistillate flowers are pedicellate and naked or with a rudimentary 3-lobed calyx. The pistillate pedicels are termed gynophores in this paper. The ovary is 3-locular and sessile. The styles are usually bifid. The structure of the dehiscent 3-locular capsule is illustrated in PLATE 655B, FIG. 7.

The embryo and endosperm are surrounded first by a light tan to nearly black structure here called the testa. Outside the testa is a layer of dried mucilage which is white and, depending on the thickness, makes the seed more or less white by obscuring the testa beneath. This dried mucilage is here called the coat. Pammel, 1891, has considered the structures surrounding the embryo and endosperm in the seeds of *Euphorbia*.

RELATIONSHIPS OF SUBGENUS CHAMAESYCE

The subgenus *Chamaesyce* has probably, as suggested in the discussion above under stems, been derived from either subgenus *Esula* or *Agaloma*. It is with the greatest difficulty that, aside from the supposedly constant difference in the development of the main axis, subgenus *Chamaesyce* can be defined so as to exclude all members of those subgenera and at the same time include all members of subgenus *Chamaesyce*.

GEOGRAPHICAL DISTRIBUTION OF THE SUBGENUS CHAMAESYCE

Subgenus *Chamaesyce* occurs native in the warmer parts of all the continents including Australia. It reaches its greatest development in subtropical regions. It has attained a remarkable development in Hawaii where some species are arborescent.

An analysis of the geographical distribution of *Euphorbia* subgenus *Chamaesyce* in Canada and the United States exclusive of southern Florida has yielded the following data: Of the 48 species occurring in this area, 17 are originally endemic though 3 are now established in other parts of the world. Of the 17, 11 are found only west of the Mississippi River, 1 only east, and 5 on both sides. Of the 31 species not native solely within the specified area, 21 are native in this area plus Mexico. Few of these 21 range south of the northern half of Mexico. Of the 10 species not included in the two preceding categories, 3, viz. *E. glomerifera*, *hirta*, and *hyssopifolia*, are predominantly subtropical or tropical, and, within the area under consideration, are found native only in southern U. S. Most of the remainder are species with wide ranges in North and South America. While no introduced species has become established in the United States or Canada there have been local introductions of species native within the area. Notable examples are *E. maculata* and *supina*. On the other hand, some of the species native solely within the area have been introduced into Europe and elsewhere, e. g. *E. polygonifolia* and *supina*.

In order to determine what region had the largest number of species the distributional maps were examined to ascertain where a circle with a fifty-mile radius would include the largest number of species. Such a circle centering at Marsh, Pima County, Arizona, includes 25 species. Of this number probably only *E. supina* is introduced. This area is fairly well known botanically and it is not likely that there will be many additional species discovered in it. Curiously enough no species is endemic within the area circumscribed by this circle. A second center of density is Elephant Mountain, Brewster County, Texas. Within a fifty-mile radius of this point 21 species occur. Probably all of these are native. In view of the fact that this region is not well known botanically and that there are several more species in adjacent regions, it is highly probable that additional species will be found here. Two species and one very distinctive variety are endemic in this region.

It may be protested that both of these centers are merely points adjacent to the Mexican deserts and owe their density to a greater density southward. If an equal area is chosen any-

where in Sonora it is not likely to surpass the Arizonan center much if at all since several species which are common in Arizona are absent in Sonora. Similarly, several species have their southern limit included in the Big Bend area of Texas and the loss of these and the species endemic in the Big Bend area would scarcely be offset by species occurring in Chihuahua or Coahuila but not in Texas. Probably a third center of density is in southern Florida but determination of that must await examination of all the species found there.

ECONOMIC VALUE

The members of *Euphorbia* subgenus *Chamaesyce* are generally of little economic value. The species are often weedy but are rarely if ever classed as noxious weeds. Occasionally stock are supposed to be poisoned by accidentally eating some of these plants mixed with other herbage. Ordinarily not even grasshoppers will eat these plants. One Kansan correspondent informed me in 1938 that grasshoppers ate nearly everything except the spurges! Some use is made of *Euphorbia hirta* as a drug plant. Aboriginal peoples often utilize the latex in their medicine. There are persistent reports that these plants are remedies for snake bite. H. M. Hall, Yosemite Flora, 151. 1912, mentions that *E. serpyllifolia* is often used for this purpose by "Indians and others". C. R. Orcutt, 1890, also discusses the supposed virtues of these plants. No serious study of the allegedly theriacal qualities of the group seems ever to have been made.

It has been stated by Standley, Field Mus. Pub. Bot. **3**: 1930, and doubtless others, that *Euphorbia hirta* harbors the organisms causing tropical leg-ulcers. Dr. J. C. Bequaert of the Harvard Medical School assures me (in conversation) that there is no proof of this. Nevertheless I consider it entirely possible. Flagellates are common in many herbaceous species of *Euphorbia* and are by no means confined to even subtropical regions, for they have been found in Europe. No study seems to have been made of the species occurring in the United States, to determine whether they, too, harbor these organisms. The literature relating to flagellates in *Euphorbia* and other laticiferous plants is voluminous. Mesnil, Ann. Sci. Nat. ser. 10, Bot. **3**: xlii-lvii. 1921, gives an interesting resumé up to that date.

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In addition to those listed above, the writer is indebted to the curators of all the herbaria listed under abbreviations for making the specimens at their disposal available for study.

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II. TAXONOMY

SCOPE OF THIS TREATMENT

This paper is intended to include all native or naturalized species of the subgenus *Chamaesyce* occurring in Canada and the United States, exclusive of Southern Florida. The species occurring in the United States only in southern Florida are mostly closely related to, or even conspecific with, the West Indian species and can be satisfactorily treated only in relation to them. The line of demarcation in Florida is at about 26°–27° north latitude. This conclusion was drawn from examination of the abundant Floridan material of the subgenus at the New York Botanical Garden. After I had reached this conclusion, Mr. E. J. Alexander stated, in conversation, that 26° north latitude is the usual northern limit of subtropical species in Florida.

It is intended to treat all members of subgenus *Chamaesyce* growing in the area specified. For species occurring primarily within the area all synonyms or alleged synonyms have, so far as possible, been considered and referred to their proper position. In order that the exact basis of all conclusions may be evident, names are treated according to their types. All names based on one type are included in one paragraph. In this paragraph the type, its location, and whether it has been examined are all concisely indicated. An exclamation point (!) is used, as is customary, to indicate that the type, photograph of the type, or isotype has been examined.

MEASUREMENTS

All measurements have been made on dried material with the exception of those of involucre, glands, androphores, bracteoles, and styles which were made after the parts were boiled in water. If in some cases it appears that the seeds would be a rather tight

fit for the capsules, remember that *fully* mature capsules dehisce on drying. Consequently the capsules measured on dry herbarium specimens are not only *slightly* immature but, in addition, must have shrunk a little in drying. This method of measuring, while open to some theoretical objections, is eminently practical since these plants are nearly always dry before identification is attempted.

The tangential dimension of the seed is the dimension in the plane normal to the radius when the seed is oriented as it is in the capsule. The radial dimension is comparable and is measured along the radius. A possible source of confusion is the statement as to the "radial" shape. This is the outline seen when looking along the radius and viewing the inner (raphal) face of the seed. The raphal face or the ventral side of the seed is the side toward the center of the capsule; the dorsal side is that away from the center.

ABBREVIATIONS

The herbaria from which material has been studied and from which specimens are cited in this revision are indicated by the following abbreviations:

- A—United States Field Station, Sacaton, Arizona.
- B—Berlin-Dahlem, Germany
- C—University of California, Berkeley.
- CA—California Academy of Sciences, San Francisco.
- CL—University of California, Los Angeles.
- Cl—Clokey Herbarium at Los Angeles Museum.
- D—Dudley Herbarium, Stanford University, California.
- Deam—private herbarium of C. C. Deam, Bluffton, Indiana, now at or in process of transfer to Indiana University.
- F—Field Museum, Chicago, Illinois.
- G—Gray Herbarium, Harvard University, Cambridge, Mass.
- Ge—Geneva, Switzerland.
- I—Intermountain Herbarium, Utah State Agricultural College, Logan, Utah.
- J—Herbarium of W. L. Jepson at University of California, Berkeley.
- K—Royal Botanical Gardens, Kew, England.
- Lam—Los Angeles Museum, Los Angeles, California.
- M—Missouri Botanical Garden, St. Louis, Missouri.
- Ma—Maria Mitchell Society, Nantucket, Mass.
- Mi—University of Minnesota.
- Mn—University of Michigan, Ann Arbor.
- Mo—University of Missouri, Columbia.
- N—National Arboretum, Washington, D. C.
- NE—New England Botanical Club at Gray Herbarium.

NY—New York Botanical Garden, New York City.

O—Oberlin College, Oberlin, Ohio.

P—Pomona College, Claremont, California.

Peir—Herbarium of Frank W. Peirson, 1077 New York Ave., Altadena, California.

Ph—Academy Natural Sciences, Philadelphia.

PhB—Philadelphia Botanical Club at Acad. Nat. Sci., Philadelphia.

RS—Rancho Santa Ana Botanic Garden, Anaheim, California.

SB—Santa Barbara Museum, California.

Sh—Forrest Shreve, private herbarium, Tucson, Arizona.

T—University of Arizona, Tucson.

US—United States National Herbarium, Washington, D. C.

W—Herbarium of the author.

Since completing the manuscript, the herbarium of Catholic University of America, Washington, D. C., and specimens from Southern Branch, University of Idaho, Pocatello, have been examined and important extensions of ranges incorporated in the maps, but no specimens from these herbaria are cited.

KEY TO SUBGENERA OF EUPHORBIA OCCURRING IN CANADA AND THE UNITED STATES

In order that it may be ascertained whether the *Euphorbia* in hand is to be found in this paper the following key to the subgenera in this area is offered.

1. Glands of the involucre without petaloid appendages; glands deeply cupped if leaves opposite below the inflorescence; leaves essentially symmetrical.
2. Glands of the involucre either deeply cupped or concealed by the inflexed linear segments of the margin; stem never branching into a symmetrical 3-several-rayed inflorescence. I. *Poinsettia*.
2. Glands of the involucre flat or convex, never concealed; leaves nearly always alternate below (stem-leaves), in a single whorl beneath the pleiochasium which is a cyme resembling an umbel (whorled leaves), opposite in the symmetrically forking inflorescence (floral leaves) II. *Esula*.
1. Glands of the involucre with petaloid appendages or, if appendages wanting, leaves all strictly opposite and with inequilateral bases.
3. Leaves alternate, opposite, or even whorled, their bases symmetrical; stipules glandlike or none. III. *Agaloma*.
3. Leaves all strictly opposite, their bases usually strongly inequilateral; stipules mostly well developed, always evident in species with symmetrical leaves. IV. *Chamaesyce*.

I. Subg. POINSETTIA (Graham) House, N. Y. State Mus. Bull. **254**: 473. 1924. (*Poinsettia* Graham, New Philos. Journ. **20**: 412. 1836). For additional synonymy see Contr. Gray Herb. **127**: 58–59. 1939.

II. Subg. *ESULA* Pers., Syn. Pl. **2**: 14. 1806. (*Euphorbia* sect. *Tithymalus* of various authors. *Tithymalus* Adans., Fam. Pl. **2**: 356, 611. 1763, et al. *Galarhoeus* Haw., Syn. Pl. Succ., 143. 1812.)

III. Subg. *AGALOMA* (Raf.) House, N. Y. State Mus. Bull. **254**: 471. 1924. (*Agaloma* Raf., Fl. Tellur. **4**: 116. 1838; *Lepadenia* Raf., op. cit., 113; *Dichrophyllum* Klotzsch & Garcke, Monatsb. Akad. Berlin **1859**: 249. 1859; *Tithymalopsis* Klotzsch & Garcke, l. c.; *Zygophyllidium* (Boiss.) Small, Fl. SE U. S. 715. 1334. 1903). For additional synonymy see Contr. Gray Herb. **127**: 57-58. 1939.

IV. Subg. *CHAMAESYCE* Raf., Amer. Mo. Mag. **2**: 119. 1817. TYPE: *Euphorbia supina* Raf.—*Chamaesyce* Raf. l. c., *nomen provisorium* under the above name. Both proposed without reference to Persoon.

Chamaesyce, Pers., Syn. Pl. **2**: 12. 1807 (as synonym of a defined subdivision of *Euphorbia* of subgeneric rank). Type: *Euphorbia Chamaesyce* L.

Anisophyllum Haw., Syn. Pl. Succ., 159. 1812, not Jacquin, Select. Stirp. Amer. Hist., 283, T. CLXXX, fig. 5. 1763. Type: *A. Peplis* (L.) Haw.; based on *Euphorbia Peplis* L. Klotzsch, Monatsb. Akad. Berlin **1859**: 247. 1859; Klotzsch, Abh. Akad. Berlin, Phys. **1859**: 13, 21. 1860.—Schweinfurth, Beitrag Fl. Aethiop. **1**: 34. 1867.—*Euphorbia* section *Anisophyllum* (Haw.) Pax in Engler & Prantl, Nat. Pflanzenfam. **3** (5): 104. 1891; Pax & Hoffman, Nat. Pflanzenfam. 2 Aufl. **19c**: 210. 1931.—*Euphorbia* subgenus *Anisophyllum* (Haw.) Heinrich Ludwig Schmidt, Über die Entwicklung der Blütenstände von *Euphorbia* L. und *Diplocyathium* n. g., 16. 1906, preprint from Beih. Bot. Centralblatt **22**: 32. 1907, published merely as "Untergattung *Anisophyllum* Haw." Without basonym, hence not valid.

Chamaesyce S. F. Gray, Nat. Arr. Brit. Pl. **2**: 260. 1821. Type: *Chamaesyce maritima* S. F. Gray, an actually and avowedly superfluous name for *Euphorbia Peplis* L. Small, Fl. SE U. S., 707. 1903; Millsp., Field Mus. Pub. Bot. **2**: 300. 1909; Lunell, Amer. Midl. Nat. **1**: 204. 1910; Small in Britton & Brown, Ill. Fl. No. U. S. & Canada, ed. 2, **2**: 462. 1913; Millsp., Field Mus. Pub. Bot. **2**: 384. 1914; Millsp., op. cit., 401. 1916; Britton, Fl. Bermuda, 212. 1918. Britton & Millsp., Bahama Fl., 237. 1920; Prokhanov, Consp. Syst. Tith. Asiae Mediae, 14. 1933; Hara, Journ. Jap. Bot. **11**: 511. 1935; Degener & Croizat in Degener, Fl. Hawaii, fam. 190, *Chamaesyce*. 1936 & 7.—*Euphorbia* subgenus *Chamaesyce* (S. F. Gray) House, Bull. N. Y. State Mus. **254**: 470. 1924.

Euphorbia section *Anisophyllum* Roeper in Duby, A. P. De Candolle, Bot. Gall. ed. 2, **1**: 412. 1828. Type: *Euphorbia*

Peplis L., designated here. G. D. J. Koch, Syn. Fl. Germ. Helv., 627. 1837; Ledebour, Fl. Ross. **3** (2): 557. 1849–51; Baillon, Étude Gen. Euphorb., 284. 1858; Engelm. in Emory, U. S. & Mex. Bound. Surv. **2** (1): 185. 1859; Boissier in DC. Prod. **15** (2). 1862; Muell. Arg. in Martius, Fl. Brasil. **11** (2): 669. 1874; Bentham & Hooker, Gen. Pl. **3**: 258. 1883; Chiovenda, Bull. Soc. Bot. Ital. **1895**: 61. 1895; Thellung, Bull. Herb. Boiss. sér. 2, **7**: 746. 1907; Thellung in Ascherson & Graebner, Syn. Mitteleur. Fl. **7**: 422. 1917; Denis, Euphorb. Iles Austr. Afr., 27. 1921.—*Tithymalus* [Tourn.] section *Anisophyllum* Gomez de la Maza, Fl. Habanera, 152. 1897.

Euphorbia A. *Chamaesyce* Reichenbach, Fl. Germ. Excurs., 755. 1832.¹ Type: *Euphorbia Chamaesyce* L. Reichenbach, Repert. Herb. Nom., 193. 1841, as *Euphorbia* “1. *Chamaesyce Caesalp.*”; Nyman, Consp. Fl. Eur. **3**: 655. 1881, merely as *Euphorbia* “g. *Chamaesyce* Rchb.”

Xamesike Raf., Fl. Tellur. **4**: 115. 1838. Type: *X. vulgaris* Raf.; based on *Euphorbia Chamaesyce* L. Rafinesque, Aut. Bot., 96. 1840.—*Xamesike* subgenus *Xamesike* Raf., op. cit., 97.

Xamesike subgenus *Xamobala* Raf., Fl. Tellur. **4**: 115. 1838; Type: *Xamesike supina* (Raf.) Raf., based on *Euphorbia supina* Raf.; Rafinesque, Aut. Bot., 97. 1840.

Aplarina Raf., New Fl. No. Amer. **4**: 98. 1838. Type: *A. prostrata* Raf. proposed without reference to *Euphorbia prostrata* Aiton.—*Xamesike* subgenus *Aplarina* (Raf.) Raf., Aut. Bot., 97. 1840.

Euphorbia section *Anisophyllum* § *Acutae* Boiss. in DC. Prod. **15** (2): 18. 1862. Type: *Euphorbia acuta* Engelm. Pax in Engler & Prantl, Nat. Pflanzenfam. **3** (5): 104. 1891; Pax & Hoffmann in Engler & Prantl, Nat. Pflanzenfam. 2 Aufl. **19c**: 210. 1931.

Euphorbia section *Anisophyllum* § *Chamaesyceae* Boiss. in DC. Prod. **15** (2): 27. 1862. Type: *Euphorbia Chamaesyce* L. Proposed without reference to earlier uses of similar names though Boiss., op. cit., 11, cites in synonymy under sect. *Anisophyllum*, genus *Chamaesyce* Haw., and “Sect. *Chamaesyce* Reichb. Fl. Germ. exc. p. 755.”

Euphorbia section *Anisophyllum* § *Hypericifoliae* Boiss. in DC. Prod. **15** (2): 20. 1862. Type: *Euphorbia hypericifolia* L. Pax in Engler & Prantl, Nat. Pflanzenfam. **3** (5): 104. 1891; Pax & Hoffmann, in Engler & Prantl, Nat. Pflanzenfam. 2 Aufl. **19c**: 210. 1931.

Euphorbia subgenus *Anisophyllum* Gaucher, Étude anat. genre *Euphorbia*, 123. 1898; proposed independently and described, no species assigned.

Glabrous to vestite herbs or sometimes sub-shrubs; leaves

¹ See page preceding title page between 434 & 435 for dates.

opposite, simple, mostly with inaequilateral bases, petioles short to none; stipules small, often united; cyathia solitary at the nodes and bifurcations or more or less congested into cymes; glands mostly 4, appendiculate or exappendiculate; staminate flowers few to numerous; bracteoles few to numerous, free to variously connate and adnate; ovary 3-celled; styles 3, bifid to entire, mostly free; capsules small, dehiscent; seeds small, ecarunculate, smooth to variously sculptured, with a gelatinous coat of varying thickness.—This description applies only to the species included in this paper.

KEY TO THE SPECIES OF SUBGENUS CHAMAESYCE

1. Ovary and capsule vestite.
 2. Perennial (except no. 3b with capsule ca. 2.5 mm. in diam.); staminate flowers 16–60 or rarely as few as 15 in nos. 25 and 26; involucre never urceolate.
 3. Cyathia borne in dense cymose glomerules, or a few in addition sometimes solitary in the upper bifurcations; leaves often serrate. 17. *E. capitellata*.
 3. Cyathia solitary at the nodes and at the tips of the branches; leaves always entire.
 4. Seeds scarcely angled, narrowly ovoid, encircled by 4–5 rounded ridges. 22. *E. pediculifera*.
 4. Seeds quadrangular, variously smooth to slightly wrinkled.
 5. Herbage with short, straight spreading hairs.
 6. Capsules 1.1–1.3 mm. in diam.; seeds sharply quadrangular. 26b. *E. polycarpa* var. *hirtella*.
 6. Capsules ca. 2.5 mm. in diam.; seeds ovoid to ovoid-quadrangular. 3b. *E. ocellata* var. *Rattanii*.
 5. Herbage variously clothed with appressed, long and weak, or matted hairs.
 7. Leaves acuminate, median mostly over 1 cm. long.
 8. Stems strigose; seeds 1.6–1.9 mm. long; capsules 2.1–2.4 mm. long. 19. *E. angusta*.
 8. At least the young stems villous; seeds 2.2–2.5 mm. long; capsule ca. 3 mm. long. 18. *E. acuta*.
 7. Leaves mostly blunt, never more than sub-acute, rarely as much as 1 cm. long.
 9. Capsules ca. 2.5 mm. long; seeds ca. 2 mm. long. 20. *E. lata*.
 9. Capsules not over 2 mm. long; seeds not over 1.7 mm. long.
 10. Appendages wider than the glands and with short spreading hairs beneath and on the margins. 24. *E. vallis-mortae*.
 10. Appendages wide to absent, glabrous or rarely with a few hairs beneath next to the involucre.
 11. Appendages usually conspicuous; styles not clavate; involucre open-campanulate. 25. *E. melanadenia*.
 11. Appendages absent or very narrow; styles clavate; involucre turbinate. 23. *E. cinerascens*.

2. Annual (except no. 39 with urceolate involucre); staminate flowers up to 12, or sometimes to 15 in nos. 35b and 43; capsules less than 2 mm. in diam.
12. Involucre urceolate.
 13. Appendages entire or crenate; hairs mostly clavate; perennial.....39. *E. arizonica*.
 13. Appendages deeply parted into a few attenuate segments; hairs tapering; annual.....40. *E. setiloba*.
12. Involucres obconical to campanulate.
 14. Cyathia borne in dense axillary and terminal leafless glomerules.....16. *E. hirta*.
 14. Cyathia solitary or on short leafy lateral branchlets.
 15. Proximal appendages greatly prolonged, often concealing the capsule.....43. *E. indivisa*.
 15. Proximal and distal appendages without marked disparity in size.
 16. Seeds punctately pitted and mottled, base depressed-truncate, apex sharply acute; styles entire, sometimes emarginate.....47. *E. stictospora*.
 16. Seeds neither punctately pitted nor mottled, base obtuse, apex not sharply acute; styles bifid.
 17. Glands without appendages or with but the merest rudiment; seeds smooth; leaves entire, not over 8 mm. long; vestiture short, straight, and spreading.....28. *E. micromera*.
 17. Glands appendiculate; seeds variously ridged or granular; leaves often serrulate, some often over 8 mm. long; vestiture long and weak, crisped, or appressed.
 18. Capsule sparsely villous; seeds not transversely ridged.....35b. *E. serpyllifolia* var. *hirtula*.
 18. Capsule strigose, or if with spreading hairs, seeds with transverse ridges.
 19. Seeds with low rounded transverse ridges not whitened on the summit or with merely granular surfaces; capsules strigose.
 20. Styles ca. 0.4–0.5, rarely to 0.6, mm. long, clavate; seed coat not granular; nodes never rooting.
 21. Capsules all exerted from the involucre.....45. *E. supina*.
 21. Capsules mostly half included and distending the involucre at maturity.....44. *E. thymifolia*.
 20. Styles ca. 0.7 mm. long, slender; seed coat granular; nodes often rooting.....46. *E. humistrata*.
 19. Seeds with narrow sharp transverse ridges, or rounded transverse ridges whitened on the summit; capsules tomentose or with crisped spreading hairs.
 22. Herbage grayish-pilose-tomentose; seeds 1.1–1.3 mm. long, the rounded ridges about the same width as the intervals between.....49. *E. laredana*.
 22. Herbage green or greenish, less densely vestite to sub-glabrous; seeds 0.9–1

mm. long, the minute sharp ridges
narrower than the intervals between

48. *E. Chamaesyce*.

1. Ovary and capsule glabrous.
 23. Stipules united into a white, glabrous, membranous scale.
 24. Annual; staminate flowers 5-10.....30. *E. serpens*.
 24. Perennial; staminate flowers 12 or more.....31. *E. albomarginata*.
 23. Stipules not united into a white, glabrous membranous scale.
 25. Styles entire, either very short and capitate or as long as the capsule and very slender.
 26. Styles about as long as the capsule, slender; leaves sharply serrulate; annual.....34. *E. Hooveri*.
 26. Styles very short, capitate; leaves entire; perennial...33. *E. astyla*.
 25. Styles bifid or if entire neither extremely short and capitate nor about as long as the capsule.
 27. Face of seed virtually flat, the inflexed apical mucro overhanging the raphe.....2. *E. platysperma*.
 27. Face of seed not flat; apical mucro wanting or minute and by no means overhanging the raphe.
 28. Delicate erect annuals with symmetrical linear leaves and capsules 1.3-1.4 mm. long.
 29. Seeds transversely wrinkled or ridged; involucre 0.9-1 mm. in diam.; appendages no longer than the glands; ultimate branchlets 0.15-0.25 mm. in diam.; longest leaves rarely as short as 1 cm.....9. *E. revoluta*.
 29. Seeds smooth; involucre 0.5-0.7 mm. in diam.; appendages usually longer than the glands; ultimate branchlets ca. 0.1 mm. in diam.; longest leaves mostly shorter than 1 cm...8. *E. gracillima*.
 28. Annuals or perennials, if leaves linear and symmetrical plants coarse and/or capsules more than 1.8 mm. long.
 30. Capsules 3-3.5 mm. long.
 31. Seeds sharply angled, larger leaves 2 cm. or more long.....11. *E. trachysperma*.
 31. Seeds compressed-ovoid; leaves not over 16 mm. long.....1. *E. polygonifolia*.
 30. Capsules less than 3 mm. long.
 32. Erect annual; leaves linear, symmetrical, with sharp discrete serrulations; capsule ca. 2.5 mm. long; appendages conspicuous; seed sublatately angled.....10. *E. florida*.
 32. Perennial, or if erect and annual, leaves not as above, and seeds not sublatately angled.
 33. Glands exappendiculate or with but a minute rudiment; leaves always entire, never linear, never more than 10 mm. long.
 34. Seeds with transverse ridges.....38. *E. theriaca*.
 34. Seeds smooth to rugulose but never transversely ridged.
 35. Capsule 2-2.3 mm. long; seeds 1.1-1.4 mm. in diam.....3. *E. ocellata*.
 35. Capsule not over 1.8 mm. long; seeds not over 0.8 mm. in greatest diam.
 36. Annual; staminate flowers 2-5...28. *E. micromera*.
 36. Perennial; staminate flowers 15-50.

- 37. Glands discoid; staminate flowers
40–50.....27. *E. Parishii*.
- 37. Glands transversely oblong; staminate flowers 15–32.....26. *E. polycarpa*.
- 33. Glands with appendages; leaves sometimes serrate, sometimes more than 10 mm. long.
- 38. Robust erect annuals with the larger leaves mostly over 15 mm. long, margins serrate.
- 39. Capsule 1.6–2.3 mm. long, wider below the equator, cymes not very dense and of mostly few to several cyathia.
- 40. Stems usually crisply hairy at least on the young tips, rarely pilose; seeds finely wrinkled.....13. *E. maculata*.
- 40. Stems mostly glabrous, sometimes pilose; seeds with broad very shallow depressions separated by low smooth ridges.....12. *E. hyssopifolia*.
- 39. Capsule 1.3–1.4 mm. long, widest at the equator or nearly so; cymes mostly very dense with numerous cyathia.....15. *E. glomerifera*.
- 38. Small prostrate to erect annuals or perennials with largest leaves mostly less than 15 mm. long, if robust and erect, leaves all entire, herbage completely glabrous, and seeds smooth.
- 41. Cyathia in leafless terminal cymes, a few in addition sometimes in the upper bifurcations; stems not pilose
17. *E. capitellata*.
- 41. Cyathia solitary, or if in leafy cymes, stems pilose.
- 42. Seeds with definite transverse ridges.
- 43. Seeds radially oblong-ovate to oblong; capsule widest at the equator; at least the stems often vestite.....37. *E. Abramsiana*.
- 43. Seeds ovate radially; capsule widest well below the equator; herbage always glabrous.....36. *E. glyptosperma*.
- 42. Seeds smooth to rugulose but never with regular transverse ridges.
- 44. Herbage variously vestite.
- 45. Seeds smooth and mostly chalky white, sharply angled; leaves sharply serrulate; annual....42. *E. serrula*.
- 45. If seeds smooth and white leaves entire and plant perennial.
- 46. Leaves entire; perennial; herbage pubescent.....26. *E. polycarpa*.
- 46. Leaves not entire, or if entire and plant perennial, stem pilose.
- 47. Carpels mostly prolonged into an empty carina; stems white with long tapering hairs.....41. *E. villifera*.

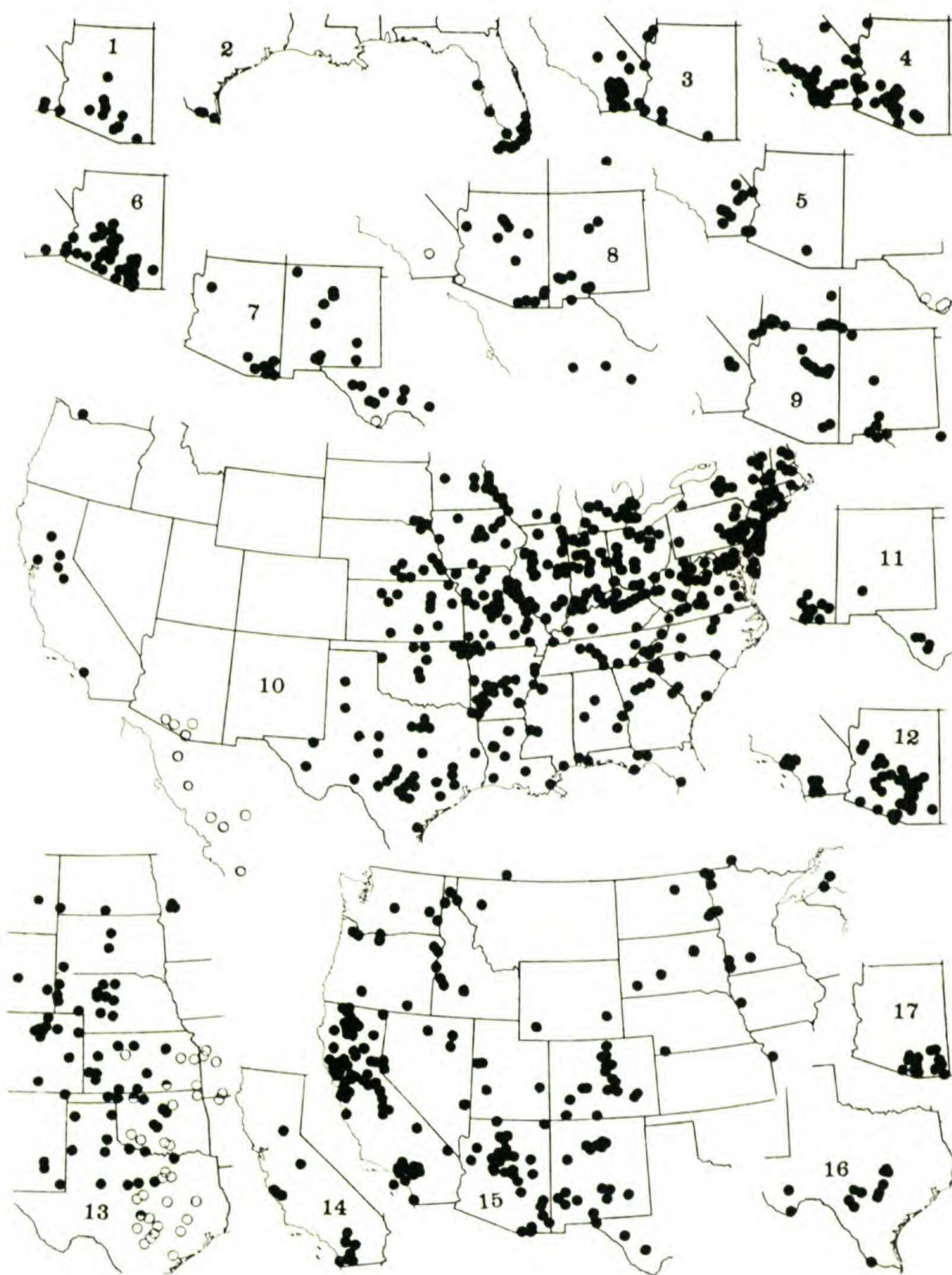
- 47. Carpels never prolonged;
stems never white with
long tapering hairs.
- 48. Leaves 5-15 or rarely 19
mm. long, ovate to
lanceolate. 14. *E. vermiculata*.
- 48. Leaves 3-7 mm. long,
broadly oblong to ob-
long-cuneate
35b. *E. serpyllifolia* var. *hirtula*.
- 44. Herbage glabrous except stipules
sometimes with cilia.
- 49. Seeds smooth, plump; leaves
always entire; plants annual,
mostly drying yellowish green.
- 50. Appendages narrow and as-
cending; involucre cupuli-
form-campanulate. 4. *E. Parryi*.
- 50. Appendages narrow to wide
but spreading; involucre
obconical to campanulate.
- 51. Staminate flowers 5-20;
plants mostly prostrate.
- 52. Styles slender, not thick-
ened at the tip; involu-
cres 1-1.1 mm. in diam.;
androphores 1-1.3 mm.
long; seeds 1.3-1.6 mm.
long; leaf-blades 4-10
mm. long; appendages
mostly 1-3 times as
wide as gland. 6. *E. Geyeri*.
- 52. Styles thickened at the
tip or rarely thicker
below and somewhat
tapering; involucre 1.2
-1.6 mm. in diam.; an-
drophores 1.4-2 mm.
long; seeds 1.5-1.9 mm.
long; leaf-blades 4-15
mm. long; appendages
mostly narrower than
the gland. 5. *E. ammannioides*.
- 51. Staminate flowers more than
20; plants ascending to
erect. 7. *E. missurica*.
- 49. Seeds often wrinkled, if smooth
mostly slender; leaves some-
times serrulate; plants annual
or perennial mostly drying
brownish to green.
- 54. Epidermis papillate at least
on the nodes; carpels often
prolonged into an empty
carina. 41b. *E. villifera* var. *nuda*.
- 54. Epidermis not papillate; car-
pels not prolonged.

- 55. Stipules parted into numerous filiform segments; leaves entire and mostly with cordate bases....29. *E. cordifolia*.
- 55. Stipules not as above; leaves serrulate or entire, not cordate-based.
- 56. Capsules more than 2 mm. long.....32. *E. Fendleri*.
- 56. Capsules less than 2 mm. long.
- 57. Annual with entire leaves; seeds 1.6–1.8 mm. long.....21. *E. Golondrina*.
- 57. Perennial, or leaves mostly serrulate if annual; seeds 1–1.4 mm. long.
- 58. Perennial; leaves entire; stipules ciliate (except in var. *simulans*); stems never winged.....26. *E. polycarpa*.
- 58. Annual; leaves mostly serrulate; stipules glabrous; stems often winged
35. *E. serpyllifolia*.

1. EUPHORBIA POLYGONIFOLIA L., Sp. Pl. 1: 455. 1753. TYPE: "Habitat in Canada, Virginia", Kalm (Linnaean Herbarium, not seen; photograph G!). Boissier in DC. Prod. 15 (2): 28. 1862; Thellung in Ascherson & Graebner, Syn. Mitteleur. Fl. 7: 439. 1917. *Anisophyllum polygonifolium* (L.) Haw., Syn. Pl. Succ., 160. 1812. *Xamesike polygonifolia* Raf., Aut. Bot., 98. 1840; based on "Euph. O[mnes]", i. e. doubtless *E. polygonifolia* of everybody, hence, by inference, Linnaeus.—*Chamaesyce polygonifolia* (L.) Small, Fl. Se. U. S., 708, 1333. 1903.

E. maritima Nutt., Trans. Amer. Philos. Soc. 5: 171. 1837. Type: "Sea coast, L[ittle?] Egg Harbor", New Jersey, [Nuttall?] (Ph!, possibly only isotype; photographs G!, W!).

Glabrous annual; stems few to several, mostly prostrate, sometimes ascending to erect, 1–25 cm. long, 1–2 mm. in diam., internodes 0.5–5 cm. long; leaf-blades 6–16 mm. long, oblong-linear to oblong-lanceolate, midrib prominent beneath, margin entire, base oblique, apex usually mucronate; petioles 1–3 mm. long; stipules distinct or ventral more or less united toward apex of stem, subulate to triangular-subulate, entire or few-parted; cyathia solitary at the upper nodes; peduncles 0.5–5 mm. long; involucre obconical-campanulate, 1–1.4 mm. in diam., glabrous without, with a ring of short hairs within at the level of the intervals between lobes and glands, sometimes extending downward beneath the glands; lobes triangular, acuminate, mostly



MAP 1, range of *EUPHORBIA ABRAMSIANA* in the U. S.; 2, *E. GLOMERIFERA* in the U. S.; 3, *E. POLYCARPA* var. *HIRTELLA* in the U. S.; 4, *E. POLYCARPA* var. *TYPICA* in the U. S.; 5, dots *E. POLYCARPA* var. *TYPICA* and var. *HIRTELLA* intergrades, circles *E. POLYCARPA* var. *SIMULANS*; 6, *E. PEDICULIFERA* var. *TYPICA* in the U. S.; 7, dots *E. SERRULA* in the U. S., circles *E. THERIACA*; 8, dots *E. REVOLUTA*, circles *E. PLATYSPERMA*; 9, *E. PARRYI*; 10, dots *E. MACULATA* in Canada and the U. S., circles *E. GRACILLIMA*; 11, *E. INDIVISA* in the U. S.; 12, *E. MELANADENIA* in the U. S.; 13, dots *E. MISSURICA* var. *INTERMEDIA*, circles *E. MISSURICA* var. *TYPICA*, half filled circles intergrades between *E. MISSURICA* vars. *TYPICA* and *INTERMEDIA*; 14, *E. SERPYLLIFOLIA* var. *HIRTULA* in U. S.; 15, *E. SERPYLLIFOLIA* var. *GENUINA* in U. S. and Canada; 16, *E. VILLIFERA* var. *TYPICA* in the U. S.; 17, *E. FLORIDA* in the U. S.

entire, slightly exceeding the glands, proximal often narrower; glands 0.3–0.4 mm. long, broadly transversely oval to subcircular or sometimes nearly double and figure-eight-shaped, shallowly cupped; appendages rudimentary or absent; fifth gland small or absent, the involucre irregular and the parts difficult to identify in this interval; sinus narrowly U-shaped to V-shaped, little depressed; bracteoles glabrous, united below, free above, forming a three- to several-parted tangential structure between and outside the fascicles, shorter than the androphores; staminate flowers 1–3 per fascicle, 5–14 per cyathium, or some of the uppermost cyathia with staminate flowers abortive or wanting; androphores 0.8–1.3 mm. long, glabrous; gynophore glabrous, soon exerted and reflexed; ovary roundly 3-lobed; styles 0.7–1 mm. long, bifid to the middle, mostly closely reflexed; capsules 3–3.5 mm. long, roundly 3-lobed, broader below the equator; seeds compressed-ovoid, base subtruncate, apex subacute, back strongly rounded, face slightly rounded, 2–2.6 mm. long, 1.6–1.9 mm. tangentially, 1–1.6 mm. radially, coat white, irregularly cellular-reticulate microscopically, the brown microfavose macroscopically smooth testa showing through.—PLATE 654A.

Sandy or gravelly beaches above high tide and sand dunes, both maritime and lacustrine, Magdalen Islands, Quebec, south to Georgia; shores of Lake Ontario, Erie, Michigan and the southern tip of Lake Huron; introduced in western Europe (MAP 42). Representative specimens seen: QUEBEC. Gaspé Co.: near the Lobster Hatchery, Grindstone, Magdalen Islands, *Fernald, Long & St. John 7720* (G, Ph). PRINCE EDWARD ISLAND. Prince Co.: near Campbell's Pond, Malpeque, *Fernald & St. John 11114* (G); Lower Sea Cow Pond, *Fernald, Long & St. John 7719* (G, Ph, US). Queens Co.: Grand Tracadie, *Fernald, Long & St. John 7722* (G, Ph, US); Brackely Point, *Fernald, Long & St. John 7721* (G, Ph). NOVA SCOTIA. Cape Breton Co.: Sydney Mines, *Bissell & Linder 21755* (G, Ph, NY). Pictou Co.: Little Cariboo Island, *C. B. Robinson 187* (NY). Cumberland Co.: Linden, Aug. 11, 1885, *Trueman* (G). Queens Co.: Central Port Mouton, *Graves, Long & Linder 21754* (G, Ph, US). NEW BRUNSWICK. Charlotte Co.: Long Pond Beach, Grand Manan, *Weatherby 5700* (G). Gloucester Co.: Tracadie Beach, *Blake 5651* (G, NY, US). MAINE. Knox Co.: Matineus, *C. A. E. Long 74* (NE). Cumberland Co.: Brunswick, railroad track, Sept. 21, 1907, *Kate Furbish* (NE). Sagadahoc Co.: Popham Beach, Aug. 6, 1894, *Fernald* (G, NE). York Co.: between Cutts Island and Gerrish Island, Kittery, *Fernald & Long 13994* (NE, Ph); Old Orchard, *Fernald 2733* (NE). NEW HAMPSHIRE. Rockingham Co.: Little Harbor, Rye, Sept. 19, 1901, *E. F. Williams* (G); Hampton, Oct. 5, 1901, *Knowlton* (G, NE). MASSACHUSETTS. Essex Co.: Salisbury, *D. White 296*

(NE); Plum Island, Newbury, *Pease* 2716 (G); Rockport, Aug. 14, 1898, *E. F. Williams* (NE). Suffolk Co.: Revere Beach, *Pease* 9858 (NE). Norfolk Co.: Quincy (Rufe's Hummock), Sept. 4, 1894, *Fuller* (NE); Cohasset, sand by shore, Aug. 9, 1882, *Deane* (NE). Plymouth Co.: Scituate, Sept. 17, 1893, *S. Harris* (NE); Marshfield, Aug. 9, 1897, *Morss* (NE); Duxbury Beach, *St. John* 787 (NE); Plymouth, *Fernald, Hunnewell & Long* 9818 (NE, Ph); Wareham, *Fernald & Long* 9821 (NE, Ph). Barnstable Co.: Barnstable, Sept. 16-17, 1916, *Bean, Bird & Knowlton* (NE, Ph); Brewster, *Fernald & Long* 17038 (NE); Truro, Aug. 6, 1896, *Rich* (NE); Provincetown, *Fernald & Long* 18584 (NE, Ph); Wellfleet, Sept. 4, 1916, *F. S. Collins* (NE); Hyannis, *Fernald, Butters & St. John* 15261 (NE); Woods Hole, *Safford* 233 (US). Bristol Co.: Dartmouth, *Collins* 2872 (NE). Dukes Co.: South Shore, Nonamesset Island, *Fogg* 2870 (NE); Nashawena, Elizabeth Islands, July-Aug., 1901, *Northrop* (NY); Edgartown, Marthas Vineyard, *Fernald* in *Pl. Exs. Gray*. 69 (G, M, NE, NY, Ph, US). Nantucket Co.: Wauwinet, *Churchill* 545 (G, M); Tuckernuck Island, Aug. 6, 1909, *Cushman* (Ma); Nantucket, 1912, *Brewster* (NE); Coatue, Aug. 12, 1933, *Wyatt & Franklin* (Ma); southwest beach, Nantucket Island, July 20, 1910, *Cushman* (Ma). RHODE ISLAND. Newport Co.: Prudence Island (Portsmouth), *Sanford* 10384 (NE); Block Island, *Fernald & Long* 9817 (G, NE, Ph). Kent Co.: Greens Island, Warwick, Aug. 13, 1921, *Hope* (NE). Washington Co.: Quonochontaug, Oct. 12, 1919, *Hope* (NE); Westerly, Aug. 31, 1919, *Weatherby & Collins* (NE). CONNECTICUT. New London Co.: Old Lyme, Sept. 29, 1917, *Woodward* (NE). New Haven Co.: New Haven, *Blewitt* 849 (NE); Orange, *Bissell* 528 (NE); Guilford, July 30, 1906, *Bartlett* (G). Fairfield Co.: Bridgeport, Sept. 4, 1898, *Eames* (G). NEW YORK. Suffolk Co.: Fishers Island, *St. John* 2787 (G); Riverhead, Long Island, *St. John* 2788 (G); Southampton, Long Island, *Clute* 257 (NY). Nassau Co.: Sand's Point, Long Island, Oct. 9, 1876, *E. G. Knight* (NY). Queens Co.: Laurelton, Long Island, *Moldenke* 2931 (NY). Jefferson Co.: along shore of Lake Ontario near Woodville, *House* 16990 (G). Oswego Co.: north spit, west of North Sand Pond, *House* 19977 (US). Monroe Co.: Windsor Beach, *Bartram* 1793 (NY, Ph). Erie Co.: Buffalo, *Williamson* 2418 (Ph). NEW JERSEY. Middlesex Co.: Long Branch, 1852, *Short* (Ph). Monmouth Co.: Sandy Hook, Aug. 15, 1887, *Stabler* (G). Ocean Co.: below Mantoloking, sand dunes, Aug. 11, 1902, *Lyons* (US). Atlantic Co.: Atlantic City, *Gross* 2498 (NY). Cape May Co.: Cape May, *Pennell* 2214 (US). Salem Co.: along Delaware River, between Straight & Black Ditches, 3.75 miles west-northwest of Hancocks Bridge, *Fogg* 7753 (G). PENNSYLVANIA. Erie Co.: Presque Isle, Erie, Sept. 3, 1868, *Porter* (US); Presque Isle, Erie, Sept. 4, 1868,

Garber (Ph). DELAWARE. Kent Co.: $\frac{1}{2}$ mile south of Smyrna River, *Larsen* 1044 (US). Sussex Co.: Ellendale, along railroad, Aug. 29, 1908, *Williamson* (Ph); Rehoboth, *Larsen* 425 (G, M, Ph); south of Bethany Beach, *Fogg* 11208 (G). MARYLAND. Worcester Co.: Ocean City, *Killip* 7343 (US). Baltimore Co.: Gunpowder River, *Plitt* 857 (G). Calvert Co.: sandy shore, Chesapeake Beach, *House* 371 (NY, US). St. Mary's Co.: beach, Tall Timbers, *Killip* 32209 (G, US). VIRGINIA. Elizabeth City Co.: Fortress Monroe, 1879, *Vasey* (US). Northampton Co.: Savage Neck, *Fernald & Long* 5350 (G, NY). Princess Anne Co.: Virginia Beach, *Heller* 1231 (G, M, Ph, US); Cape Henry, *Kearney* 1812 (US). NORTH CAROLINA. New Hanover Co.: Carolina Beach (below Wilmington), *Biltmore Herb.* 3838^a (G, M, NY, US). Carteret Co.: Atlantic Beach, *R. K. Godfrey* 6490 (G); Sold, Salter Path, Bogue Island, July 15, 1926, *Anonymous* (Ph). SOUTH CAROLINA. Charleston Co.: Isle of Palms, *Biltmore Herb.* 3838^b (US). Beaufort Co.: Bulls Point Beach, St. Helena Island, *Cuthbert* 707 (NY). GEORGIA. Chatham Co.: Tybee Island, *Harper* 736 (NY, US). Glynn Co.: Saint Simons Island, *Biltmore Herb.* 3838^c (US). ONTARIO. Prince Edward Co.: Wellington, Sept. 3, 1902, *Fowler* (G, US). Welland Co.: Point Abino, *Biltmore Herb.* 3838^d (US), *McCalla* 287 (US). Lambton Co.: Point Edward, *Macoun* 88089 (G). MICHIGAN. St. Clair Co.: shore of Lake Huron, near Port Huron, Aug. 8, 1895, *C. K. Dodge* (G, US); Fort Gratiot, along St. Clair River, July 20, 1870, *Gillman* (G). Leelanau Co.: $\frac{3}{4}$ mile east of shore of Lake Michigan, Glen Haven, *Hermann* 2248 (G). Berrien Co.: Harbert, *Johnson* 1132 (US); lake shore, St. Joseph, Aug. 10, 1838, *Houghton* (NY). OHIO. Lake Co.: Lake Erie, Salida Beach, *Webb* 1436 (G). Cuyahoga Co.: Lake Erie, Cleveland, 1840, *Sullivant* (Ph). Erie Co.: lake shore, Vermilion, Sept. 16, 1895, *Dick* (US); Lake Erie, Cedar Point, July 17, 1914, *MacDaniels* (G). INDIANA. Laporte Co.: frequent at Michigan City, *Deam* 5206 (G, NY). Porter Co.: Lake Michigan, Mineral Springs, *Lansing* 3359 (G, US); Dune Park, *V. H. Chase* 205 (G, M), *A. Chase* 2111 (US), *Umbach* 1917 (Ph). Lake Co.: Lake Michigan, Miller's, Aug. 14, 1897, *Umbach* (US), Sept. 4, 1911, *Sherff* (G); Lake Michigan, Whiting, Aug. 18, 1897, *A. Chase* (Ph). WISCONSIN. Door Co.: Lake Michigan, Sturgeon Bay, *Fassett* 18156 (G, M). Kewaunee Co.: Algoma, *Fassett & Wilson* 14674 (G, M). Milwaukee Co.: Milwaukee, 1865, *Lapham* (G). Racine Co.: Racine, Sept. 1878, *Davis* (G). ILLINOIS. Lake Co.: Waukegan, *Gleason & Shobe* 336 (G). Cook Co.: near shore, Sheridan Park, Chicago, *A. Chase* 1896 (US). FRANCE: Gironde, sables maritimes, Soulac, Oct., 1903, *Pitard* (G).

2. EUPHORBIA PLATYSPERMA Engelm. ex S. Watson, Bot. Calif. 2: 482. 1880. TYPE: Near the mouth of the Colorado

River, southern Arizona, 1869, *Ed. Palmer 2* (M 144649!; photographs G!, W!; ISOTYPES F!, G!, NY!, US!).

E. eremica Jepson, *Man. Fl. Pl. Calif.*, 600, 1925. TYPE: Coachella Valley (Conchilla Desert), Riverside County, California, alt. ca. 200 feet, May, 1914, *Jepson 6074* (J!). According to Jepson in litt. "*Euphorbia eremica* was collected in the Conchilla Desert between Thousand Palms Canyon and Palm Springs, but much nearer the former place." This species was proposed without consideration of *E. platysperma* which was hidden in "Additions and Corrections to Vol. II".

Annual; stems prostrate, 1–1.5 mm. thick, slightly longitudinally wrinkled, 10–27 cm. long, very slightly glutinous, glabrous, internodes 1–3 cm. long; leaves yellowish green, glabrous; blades oblong to obovate, often mucronate, 5–10 mm. long, margin entire, base slightly oblique, midrib evident; petioles 1.5–2.5 mm. long; stipules glabrous, 1.5–2 mm. long, with two or three divisions, distinct, or united below toward stem-apex; cyathia solitary at the nodes; peduncles slightly angled, as much as 5 mm. long, glabrous; involucre glabrous without, glabrous within except for a tuft of short hairs below each gland and a small fringe at the base of each lobe, shallowly campanulate, 1.5–2 mm. in diam.; lobes equaling the glands, glabrous except within below, deltoid-truncate, apex entire or slightly bifid; glands mostly slightly radially elongate, 1 mm. wide, facing obliquely outward, sessile, outer margin sometimes produced into two short rounded lobes, i. e., emarginate, margin lighter color than the brownish inner portion but scarcely differentiated into an appendage; fifth gland subulate, half as long as the lobes, glabrous; sinus U-shaped, slightly depressed; bracteoles 1–1.5 mm. long, distinct, with a few short hairs above, forming a fringe of 20–25 bracteoles around the outside of each fascicle of staminate flowers, not adnate to the involucre; staminate flowers mostly 10 per fascicle, 50 per cyathium; androphores glabrous, 2 mm. long, exserted; gynophore glabrous, long-exserted and reflexed at maturity, slightly angled; ovary glabrous, scarcely lobed, carpels evidently channeled on back; styles stout, parted to the base, 0.5 mm. long; capsule rotund-ovoid, slightly 3-lobed, ca. 4 mm. long, glabrous, carpels slightly ridged on back; seeds white, microreticulate, 2.4–3 mm. long, 1 mm. radially, 1.7 mm. tangentially, broadly oblong radially, base truncate obliquely inward, apex with an inflexed mucro, back rounded, smooth, face with two smooth, flat, nearly approximate, slightly depressed facets separated by the elevated raphe.—PLATE 665D.

California to Arizona? (MAP 8).

Only the two above-cited collections of this species are known. Jepson found but one plant and Palmer appears likewise to have

found only one. The exact locality of Palmer's collection is uncertain. The data on labels vary. Some read merely "Southern Arizona", others "Near mouth of Colorado R.", and Engelmann's own "near the mouth of the Colorado River, Ariz."

This species is of particular phytogeographic interest in that it is seemingly an originally littoral species closely related to the common *E. polygonifolia* of the Great Lakes and Atlantic Coast. The rarity of this plant may well be due to the change from littoral to inland desert habitat caused by the geologically recent recession of the sea from the Salton Sink. The sea covered this area so recently that the old beach-line is plainly discernible and small delicate gastropod shells left lying on the desert have yet to disintegrate. Perhaps examination of the old beach line, particularly in sandy areas, will yield further collections.

3. *EUPHORBIA OCELLATA* Durand & Hilgard, Journ. Nat. Acad. Sci. ser. 2, **3**: 46. 1854.

Annual; stems prostrate, few to numerous, to 20 cm. long, often to 1.5 mm. diam., slightly longitudinally wrinkled, glabrous or pubescent, internodes 1–3 cm. long; leaves glabrous or pubescent, blades entire, ovate-deltoid-falcate, 4–10 mm. long, apex blunt or mucronulate, base oblique, midrib elevated beneath and lateral veins prominent, margin revolute, or ovate-lanceolate, 7–15 mm. long, acuminate, base obtuse and only slightly oblique, midrib not elevated below and lateral veins mostly obscure, margin plane; petioles 1.5–2 mm. long, amplexicaul on lower side of stem; stipules distinct or lower slightly united at the base toward the stem-tips, filiform or broader, entire or parted, glabrous or pubescent, 1–1.3 mm. long; peduncles stout, 2–4 mm. long, glabrous or pubescent; cyathia solitary at the nodes; involucre turbinate to campanulate, 1.5–2 mm. diam., five-lobed especially in the late season, glabrous or pubescent without, pubescent above within; lobes broadly deltoid, pubescent on inner side or both sides and opaque throughout or glabrous and hyaline above, variously toothed or nearly entire, equaling the glands; glands discoid or slightly radially elongate, 0.5–0.7 mm. diam., yellowish or reddish, on short stout stipes, glabrous or pubescent without and pubescent within; fifth gland linear, equaling the glands; glands exappendiculate or rarely with narrow white appendages; bracteoles nearly equaling the glands, in a group opposite each gland, more or less united below and adnate to the involucre, ca. 5–10 per group, tips heavily or sparsely beset with short stout hairs; staminate flowers 8–13 per fascicle, 40–60 per involucre; androphores 1.7–2 mm. long, glabrous, barely equaling or mostly

shorter than the glands; gynophore glabrous or with short hairs above, long-exserted and usually reflexed at maturity; ovary three-angled, glabrous or pubescent; style ca. 0.5 mm. long, parted to the middle, glabrous throughout or pubescent below, divisions terete; capsules strongly three-lobed, 2–2.3 mm. long, broader than long, glabrous or with short spreading hairs, carpels rounded on the back and mostly with a very low channeled ridge on the back; seeds ovoid, with lateral angles barely visible or wanting, or turgidly quadrangular, suborbicular to ovate-acute radially, 1.4–1.7 mm. long, 1.1–1.3 mm. radially and tangentially, smooth to rugose, coat white, microreticulate, sometimes little obscuring the brown to gray testa.

KEY TO VARIETIES

Herbage glabrous.

Median leaves ovate-lanceolate, not at all or very slightly falcate, acuminate, usually without evident lateral veins;

seeds always smooth. c. var. *arenicola*.

Median leaves ovate-deltoid-falcate, blunt or mucronulate,

lateral veins evident below; seeds often rugulose or rugose. . . a. var. *typica*.

Herbage pubescent. b. var. *Rattanii*.

3a. *E. OCELLATA* D. & H., Journ. Nat. Acad. Sci. ser. 2, **3**: 46. 1854, var. *TYPICA* L. C. Wheeler, Bull. Torr. Bot. Club **63**: 402. 1936. TYPE: Poso Creek, Kern County, California, *Dr. A. Heermann* (Ph!, possibly only isotype; photographs G!, W!). An average member of the species. Durand & Hilgard, Rep. Expl. Miss. R. to Pacific Ocean **5** (**3**): 15, t. 18. 1855, seed bad.—*Chamaesyce ocellata* (D. & H.) Millsp., Field Mus. Pub. Bot. **2**: 410. 1916.

Chamaesyce sulfurea Millsp., Field Mus. Pub. Bot. **2**: 405. 1916. TYPE: hills near Big Chico Creek, east of Chico, Butte County, California, Sept. 16, 1913, *A. A. Heller 11140* (F 411411!; photographs G!, W!; isotypes C!, D!, G!, M!, Ph!, US!). A local race with rugose-tuberculate seeds, seemingly too ill-defined for recognition.—*E. ocellata* D. & H. var. *sulfurea* (Millsp.) Jepson, Fl. Calif. **2**: 427. 1936.

Glabrous except within the involucre; median leaves ovate-deltoid-falcate, 4–10 mm. long, apex blunt or mucronulate, base oblique, midrib conspicuous, elevated, lateral veins evident, margin revolute; glands exappendiculate; seeds smooth to rugose, back and lateral angles visible.—PLATE 665A.

Cismontane valleys of California from Shasta County south to San Bernardino County (MAP 22). Representative specimens seen: CALIFORNIA. Siskiyou Co.: Dunsmuir, *Jepson 6159* (J). Tehama Co.: near Red Bluff, northeast side of Sacramento River, in the low hills, *Jepson 15279a* (J). Contra Costa Co.: Mount Diablo, *Jepson 13926* (J). Stanislaus Co.: La Grange, *Jepson 13925* (J). Monterey Co.: Jolon, *Vasey 577* (Ph).

Fresno Co.: Rancho Cantua, Cantua Creek, Sept., 1908, *Lillis* (J). Tulare Co.: Halstead's Ranch to Davis Ranch, north fork of Kaweah River, Sierra Nevada, *Jepson* 577 (J). Kern Co.: Cottonwood Creek on River Road, between Bakersfield and Bodfish, *Abrams* 5341 (NY); near Haviilah, *Coville & Funston* 1081 (US). San Bernardino Co.: sandy plains, Colton, 1882, *Pringle* (G, NY, Ph). For citation of additional specimens see Bull. Torr. Bot. Club **63**: 403. 1936.

This entity is very uniform throughout most of its range. The plants of the San Bernardino region, though probably isolated at the same time as those of the Mohave Desert, show no significant differences from those of the Central Valley. Incidentally, collectors would do well to search for this plant near San Bernardino. Parish made several collections in this vicinity before 1900 but recent collectors have not found it. The uncultivated brushy plain northwest of Slover Mountain and north of Jurupa Mountains (Hills) is a likely place. The specimen from Dunsmuir in the Sacramento River canyon is probably a chance introduction. The small leaves, long internodes, and slender stems support this supposition.

At the extreme north end of its range *E. ocellata* breaks into local races. Var. *Rattanii*, q. v. infra, is the best marked. Var. *sulfurea* (Millsp.) Jepson is one of these ill-defined local races. I have no particular quarrel with anyone wishing to recognize it. Collectors will do well to secure a close series of *E. ocellata* at the north end of the Sacramento Valley around Chico and Oroville in order to determine the stability and range of var. *sulfurea* and the race north of Oroville. This race, which is usually readily recognizable by color, occurs at Table Mt. Olive Ranch, 7 miles north of Oroville, Butte Co. and is well represented by A. A. Heller 11143 (C, G, M, NY, Ph, US). Another collection made at apparently the same place and season three years later, Heller 12645 (F, G, M, NY, Ph, US) largely lacks the reddish cast but the foliage agrees fairly well in shape. The foliage and long internodes of this Oroville race bear a close resemblance to the var. *sulfurea* of the foothills near Chico. But the seed coats of the Oroville plants are only very slightly wrinkled instead of strongly rugose as in var. *sulfurea*. The plants of this Oroville race are usually reddish in color. Otherwise the species is yellow-green throughout except for some individuals of the pubescent

var. *Rattanii*. Besides the elongate internodes the Oroville facies differs from var. *typica* in the slightly larger and less falcate leaves.

3b. *E. ocellata* D. & H. var. *RATTANII* (S. Wats.) L. C. Wheeler, Bull. So. Calif. Acad. Sci. **33**: 107. 1934.—*E. Rattanii* S. Wats., Proc. Amer. Acad. Arts & Sci. **20**: 372. 1885. TYPE: Stony Creek, Glenn County (formerly part of Colusa Co.), California, June 1884, *V. Rattan* 57 (G!, fragment F!).—*Chamaesyce Rattanii* (S. Wats.) Millsp., Field Mus. Pub. Bot. **2**: 411. 1916.

Like variety *typica* but the herbage beset throughout with short stout hairs; upper half of the gynophore, the ovary, and styles pubescent in like manner; glands often with very narrow white appendages; seeds turgidly quadrangular, ovate-acute radially.—PLATE 665B.

Local in the Lower Stony Creek drainage, Glenn Co., California (MAP 24). Additional specimens seen: CALIFORNIA. Glenn Co.: Stony Creek, two miles north of Orland, *L. C. Wheeler* 4041 (CL, Peir, P, W); gravelly bed of a large winter stream 5 miles east of Newville, *A. A. Heller* 11555 (C, CA, D, F, G, M, NY).

This is certainly an incipient species. With only the type Watson was fully justified in believing it a distinct species for, in addition to the presence of appendages and pubescence, the seeds of the type are all dark gray and evidently angled. But in my collection made at the type locality some seeds were distinct as in the type but others matched those of var. *typica*.

3c. *E. ocellata* D. & H. var. *ARENICOLA* (Parish) Jepson, Man. Fl. Pl. Calif., 600. 1925.¹ *E. arenicola* Parish, Erythea **7**: 93. 1899. TYPE: Camp Cady (Sink of the Mohave River on some labels), Mohave Desert, San Bernardino County, California, *S. B. & W. F. Parish* 1370 (D!; ISOTYPES C!, F!, G!, M!, Ph!, US!).—*Chamaesyce arenicola* (Parish) Millsp., Field Mus. Pub. Bot. **2**: 408. 1916.—*E. cuspidata* Engelm. ex Parish, Erythea **7**: 93. 1899, in synonymy; not A. Bertoloni, Misc. Bot. **2**: 9. 1843.

Leaves ovate-lanceolate, acute, to 15 mm. long, base slightly oblique, midrib straightish, not elevated below, lateral veins mostly obscure; seeds strictly ovoid or the back and lateral angles slightly evident, very smooth.—PLATE 665C.

Mohave Desert, California, east to Nevada, Utah, and northwestern Arizona (MAP 22). CALIFORNIA. Inyo Co.: Searle's Lake, *Jepson* 7144 (J). San Bernardino Co.: sand hills, Soda

¹ Title-page date questionable but here accepted as no conflict as to priority is involved.

Lake, *Parish 10375* (CA, F, J). NEVADA. Washoe Co.: Wadsworth, *Kennedy 918* (C, D, M, NY, US). Churchill Co.: Fallon, *Headley 42* (US). Truckee Desert, *S. Watson 1077* (US). UTAH. near Pahvant Butte, *J. A. Harris 2534* (G). ARIZONA. Mohave Co.: Virgin River, *Purpus 6187* (C, NY). For citation of additional specimens see Bull. Torr. Bot. Club **63**: 404. 1936.

4. EUPHORBIA *PARRYI* Engelm., Amer. Nat. **9**: 350. 1875. TYPE: loose drifting sand, St. George, Washington County, Utah, 1874, *C. C. Parry 274* (M 144658!; photographs G!, W!; ISOTYPE G!). Rather small plants.—*Chamaesyce Parryi* (Engelm.) Rydb., Bull. Torr. Bot. Club **40**: 53. 1913.

E. petaloidea Engelm. ♂ *flagelliformis* Engelm. in Emory, U. S. & Mex. Bound. Surv. **2** (1): 185. 1859. TYPE: valley of the Rio Grande near Frontera, subsaline sandy soil, El Paso County, Texas, July 26, 1851, *C. Wright 1826* (M 149817!; photographs G!, W!; ISOTYPE G!). Large plants.—*E. zygophylloides* Boiss. var. *flagelliformis* (Engelm.) Engelm. ex Boiss. in DC. Prod. **15** (2): 29. 1862.—*E. flagelliformis* (Engelm.) Engelm. in T. S. Brandegee, Bull. Geol. Geogr. Surv. Terr. **2**: 243. 1876.—*Chamaesyce flagelliformis* (Engelm.) Rydb., Bull. Torr. Bot. Club **33**: 144. 1906, Bull. Colo. Agr. Exper. Sta. **100**: 223. 1906 (Fl. Colorado).

E. longeramosa S. Watson, Proc. Amer. Acad. Arts & Sci. **25**: 161. 1890. TYPE: sand hills near Samalayuca, Chihuahua, Mexico, Sept. 13, 1888, *C. G. Pringle 2000* (G!; ISOTYPE M!). Large plants like type of *E. flagelliformis*.—*Chamaesyce longeramosa* (S. Wats.) Millsp., Field Mus. Pub. Bot. **2**: 410. 1916.

Annual, glabrous; stems prostrate to erect, 5–70 cm. long, leaves 5–28 mm. long, linear, entire, aequilateral, shortly petiolate; stipules distinct, linear, entire or parted; cyathia long-peduncled; involucre cupuliform-campanulate, 1.5–1.75 mm. in diam.; glands 0.3–0.5 mm. long, transversely oval, cupped; fifth gland linear, equaling the glands; sinus very broadly U-shaped, not depressed; appendages narrow, white, glabrous, entire, margining all except the inner side of the gland, ascending; androphores 40–55, 1–1.2 mm. long; capsule deeply 3-lobed to bluntly 3-angled, oblate-spheroid, 2 mm. long; seeds ovoid-triangular, 1.8 mm. long, narrowly ovate radially, mottled brown and white.—PLATE 654D.

Southwestern Colorado; Utah and Nevada; San Bernardino County, California; Arizona; New Mexico; Western Texas; and northern Chihuahua, Mexico (MAP 9). Representative specimens seen: COLORADO. Montezuma Co.: sandy plains, San Juan Valley, 1875, *T. S. Brandegee* (M). UTAH. Grand Co.: 5 miles west of Moab on desert, *Maguire & Redd 1958* (I, M). Kane Co.: Kanab, in sand, *Jones 6044* (M, NY). Washington Co.: 2½ miles west of Toquerville, *B. Maguire, Ruth Maguire & G. Piranian 12315* (G, I); Anderson's Ranch, *Maguire & Blood 1435*

(I). San Juan Co.: Copper Canyon, 2 miles from San Juan River, *Cutler 2286* (US); Wayland farm, Cottonwood Canyon, Bluff, *Maguire, Richards & Hammond 5744* (I); San Juan River near Montezuma Creek, *Eastwood 137* (G). NEVADA. Clark Co.: near Moapa, *Train 1875* (N). CALIFORNIA. San Bernardino Co.: Devil's Playground near Kelso, June, 1905, *K. Brandegee* (C); sand dunes near Kelso, May 15, 1939, *Jaeger* (G). ARIZONA. Mohave Co.: sand dunes, Beaver Dam Creek, Virgin River, *Goodding 759* (G, M, NY, US). Coconino Co.: Moqui Village, Aug., 1891, *Owens* (G); cindery soil near Tolchaco, *H. C. Hanson A210* (M, NY). Navajo Co.: Holbrook, *Rusby 827* (F, NY, Ph, US); Winslow, *Peebles 9599* (US). Apache Co.: Adamana, Sept. 1, 1909, *Rusby* (NY); Billings, on Puerco River, *Jones 4720* (I, NY, US). Graham Co.: Camp Goodwin, Gila Valley, *Rothrock 339* (M, US). Cochise Co.: Bowie, Sept., 1884, *Jones* (US); near Wilcox, Sept. 8, 1914, *Shreve* (W). NEW MEXICO. Doña Ana Co.: 2 miles northwest of San Miguel, *Fosberg S3785* (G, O); Straus' Station, 1912, *Stearns* (M). Socorro Co.: Sabinol, *Wooton 349* (M). TEXAS. El Paso Co.: *Cory 1922* (G). MEXICO. CHIHUAHUA: 36 miles south of Ciudad Juarez, *Shreve 7922* (W); Sapio, Sierra Madre, Sept. 10, 1903, *Jones* (M, US); Colonia Diaz, *Nelson 6455* (US).

5. *EUPHORBIA AMMANNIOIDES* HBK., Nov. Gen. & Sp. **2**: 55 (quarto), 44 (folio). 1817.¹ TYPE: In arenosis, Cumana, Venezuela, *Bonpland 406* (Herb. Mus. Paris; fragment F!, photograph G!).—*E. maritima* Willd. ex Boiss. in DC. Prod. **15** (**2**): 28. 1862, in synonymy.—*Chamaesyce ammannioides* (HBK.) Small, Fl. Se U. S., 709, 1333. 1903.

Chamaesyce Ingallsii Small, Fl. Se U. S., 708, 1333. 1903. TYPE: New Orleans, Louisiana, 1835, *Dr. Ingalls* (NY!, photographs G!, W!).—*E. Ingallsii* (Small) Cory, RHODORA **38**: 406. 1936.

Glabrous annual; stems usually prostrate, 4–40 cm. long, mostly 1–2 mm. thick, internodes 0.5–4.5 cm. long; leaf-blades 4–15 mm. long, mostly narrowly to broadly oblong, occasionally elliptic-oblong, apex sometimes mucronate, usually obtuse, base obtuse, inequilateral; petioles 1–2 mm. long; stipules glabrous, 1–1.3 mm. long, distinct, parted into usually 3 linear segments; peduncles short; cyathia solitary at the nodes; involucre obconical-campanulate, 1.2–1.6 mm. in diam., glabrous outside, short-hairy at the summit inside; lobes triangular, acuminate, tips glabrous, slightly exceeding the glands; glands subcircular to transversely elliptical or oblong, 0.4–0.6 mm. in diam., slightly cupped; appendages mostly narrower than the

¹ See J. H. Barnhart, Dates of the "Nova Genera" of Humboldt, Bonpland and Kunth, Bull. Torr. Bot. Club **29**: 585–598. 1902. The name, originally printed as *E. ammannioides*, corrected to *E. ammannioides* by HBK. op. cit. **7**: 294 (quarto). 1825.

glands, rarely up to twice as wide; 5th gland linear, rarely of two parallel linear segments, $\frac{1}{2}$ as long as to equaling the lobes; sinus U- to V-shaped, slightly depressed; bracteoles numerous, linear, often somewhat united below, glabrous below, short-hairy above, between and outside the staminate flowers, some adnate to involucre beneath the glands, a little shorter than the androphores; staminate flowers 5–16 per cyathium; androphores 1.4–2 mm. long, glabrous; gynophore glabrous, soon exerted and reflexed; ovary roundly 3-lobed; styles 0.35–0.5 mm. long, thick, bifid to about the middle, mostly clavate; capsule 2–2.1 mm. long, broader than long, wider below the equator, strongly roundly to subacutely lobed; seeds ovoid sub-triangular, 1.5–1.9 mm. long, 1.3–1.5 mm. tangentially, 1.3–1.5 mm. radially, coat mottled white, microreticulate.—PLATE 654B.

Coastal sands: southern Virginia, North Carolina, Florida west to Texas; northern South America (MAP 39). Representative specimens seen: VIRGINIA. York Co.: York River northwest of Yorktown, *Fernald & Long* 7510 (G); York River above Yorktown, *Fernald & Long* 12703 (W). Surry Co.: inner border of sand-beach of Cobham Bay, James River, northwest of Chipokes, *Fernald & Long* 12705 (W). Isle of Wight Co.: inner border of sandy beach, Burwell's Bay, James River, below Rushmere (Fergusson's Wharf), *Fernald & Long* 12706 (W); inner border of sand beach along James River, Ragged Island, northeast of Carrollton, *Fernald & Long* 12704 (W). Princess Anne Co.: Virginia Beach, *Heller* 1231 (NY). NORTH CAROLINA. Carteret Co.: sand banks near Beaufort, *Lewis* 164 (NY). FLORIDA. Duval Co.: Pablo Beach, *Lighthipe* 427 (NY). Volusia Co.: Mosquito Inlet, *Moldenke* 5301 (NY). Dade Co.: beach opposite Miami, *Small* 2113 (NY). Lee Co.: seashore, Punta Rassa, *A. S. Hitchcock* 320 (F, G, M, NY). Manatee Co.: Palmetto, *Nash* 2448 (G, NY); Snead's Island, *Tracy* 6376 (G, M, NY). Pinellas Co.: St. Petersburg, Aug. 5, 1894, *Lewton* (NY). MISSISSIPPI. Jackson Co.: Horn Island, *Tracy* 4717 (NY); Dog Key, *Tracy & Earle* 2882 (NY). Harrison Co.: Cat Island, *Lloyd & Tracy* 207 (NY). LOUISIANA. Quemines Co.: Battledore Island, *Lloyd & Tracy* 214 (G, M, NY). Jefferson Co.: south central Grande Isle, *Cangemi & Andrus* 1 (NY). TEXAS: Cameron Co.: Boca Chica, *Clover* 356 (NY).

Boissier in DC. Prod. **15** (2): 28. 1862 included *E. bombensis* Jacquin, Enum. Pl. Carib., 22, 1760 (not seen, but ed. 2, 1762 examined), Select. Stirp. Amer. Hist., 151. 1763, as a possible synonym, judging by the description, of *E. ammannioides*. I draw the same conclusion. However, until some of Jacquin's specimens of this species are located, I hesitate to use the name since

the description is too vague to apply to any one species with certainty.

E. ammannioides presents a very puzzling problem, not only in its marked similarity to and close relationship with *E. Geyeri* but also in its internal heterogeneity. Floridan, Mississippian, and Louisianan specimens examined present, with but two exceptions, a reasonably uniform unit characterized by very narrow appendages, styles markedly clavate, and staminate flowers generally 5–7. The two exceptional collections are: FLORIDA. Manatee Co.: Snead's Island, Sept. 10, 1899, *Tracy 6376* (NY). Dade Co.: Sand dunes opposite Miami, Mar. 7, 1915, *J. K. & E. W. Small 5869* (NY). The first has 10–15 staminate flowers and appendages sometimes as wide as the glands. The second has the glands virtually obsolete on some involucre and the lobes strongly inflexed, making the involucre 5-lobed. The Virginian specimens are rather stunted and can be fairly well matched in aspect, though not in technical details, by some specimens of *E. Geyeri*. The Texan plants, of which there are but two collections available, have 7, 9, 9, 15, and 16 staminate flowers per cyathium in the five counted. *Clover 356* is particularly marked in its general coarseness and its appendages up to twice as wide as the glands. It has the styles thickened below and slightly tapering. The fragment of the type of *Euphorbia ammannioides* has 15 staminate flowers in the one cyathium dissected, appendages from narrower than to a little wider than the glands, and thick, very slightly clavate styles. The type, from Venezuela, seems about intermediate between the Texan and Floridan plants.

Heller 1231 from Virginia is *Euphorbia polygonifolia* in some herbaria. *Fernald & Long 7510* was also probably *E. polygonifolia* in part, for seeds of that species were intermixed. Professor Fernald informs me that at all stations in Virginia where *E. ammannioides* has been found *E. polygonifolia* is also present. The latter is paler in color and more inclined to occupy the lower border of the beach, near high-water mark, while *E. ammannioides* characterizes the sands farther back from shore.

6. EUPHORBIA GEYERI Engelm. in Engelm. & Gray, Bost. Journ. Nat. Hist. 5: 260. 1845. TYPE: Beardstown, Cass County, Illinois, Aug., 1842, C. A. Geyer (M 47878!; photographs G!,

W!; ISOTYPES G!, NY!).—*E. Geyeri* Engelm. var. *microsperma* A. Gray, Man. Bot. No. U. S. ed. 2, 386. 1856.—*Anisophyllum Geyeri* (Engelm.) Klotzsch & Garcke, Abh. Akad. Berlin, Phys. **1859**: 23. 1860.—*Chamaesyce Geyeri* (Engelm.) Small, Fl. SE U. S., 709, 1333. 1903.

E. polyclada Boiss., Cent. Euph., 10. 1860. TYPE: "Collection du Texas oriental, faite en 1848–49, recue en 1850," C. Wright (Ge!; photographs G!, W!). The Texan phase with slightly more blunt seeds.—*Chamaesyce polyclada* (Boiss.) Small, Fl. Se. U. S., 711, 1333. 1903.

Glabrous annual; stems several, mostly prostrate, occasionally erect, 6 to 37 cm. long, 0.4–1.4 mm. thick, internodes up to 3 cm. long, average about 1 cm.; leaf-blades oblong to ovate-oblong to elliptic-oblong, 4–10 mm. long, margin entire, base oblique, apex obtuse or emarginate, usually mucronate; petioles 1–2 mm. long; stipules distinct, or the ventral united, glabrous, ca. 1.5 mm. long, mostly parted into 3 filiform segments; cyathia solitary, sometimes somewhat clustered by the shortening of the uppermost internodes; peduncles up to 2 mm. long; involucre broadly campanulate, slightly tapering to the peduncle, 1–1.1 mm. in diam., glabrous outside, with a few hairs at the summit inside; lobes triangular, acuminate, tips glabrous, slightly exceeding the glands; glands broadly oval to subrotund, slightly cupped to folded, 0.2–0.6 mm. long; appendages white, from one half to twice as wide as the gland, rounded or sometimes pointed, entire or slightly toothed; fifth gland linear, hairy below inside, $\frac{2}{3}$ as long as, to equaling the lobes; sinus U-shaped, not depressed; bracteoles forming a radial partition beneath each gland, adnate to the involucre nearly up to the base of the stipe of the gland but with inwardly branching linear segments scattered along the inner edge, segments linear, bearing a few to many hairs at the apex, about equaling the androphores, bracteoles in addition often forming a sheath, parted into hairy segments above, outside each fascicle; staminate flowers 1–5 per fascicle 5–17 per cyathium; androphores glabrous, 1–1.3 mm. long; gynophore glabrous, soon exerted and reflexed; ovary 3-lobed; styles 0.3–0.6 mm. long, $\frac{1}{3}$ – $\frac{1}{2}$ bifid; capsule 2 mm. long, roundly and deeply 3-lobed, wider below the equator, base truncate; seed ovoid-subtriangular, ovate to narrowly ovate radially, 1.3–1.6 mm. long, 1 mm. tangentially and radially, coat smooth, microreticulate, white but the brown testa often showing through.—PLATE 654C.

Sandy barrens or dunes mostly along rivers, Wisconsin, Illinois, Minnesota, Iowa, North Dakota, Nebraska, south to northern Texas, west to eastern Colorado and New Mexico (MAP 20). Representative specimens seen: WISCONSIN. Pepin Co.: open dunes, upper terrace, Pepin, *Fassett 10260* (G). Trempealeau Co.: Trempealeau, *Fassett & Wilson 5308* (G). La

Crosse Co.: La Crosse, 1861, *Hale* (M). Lancaster Co.: Boscobel, 1861, *Hale* (G, M, NY). ILLINOIS. Lee Co.: Dixon, *Vasey* (G). Henderson Co.: banks of Mississippi River, near Oquawka, Sept. 18, 1871, *Patterson* (G). Mason Co.: Havana, Aug. 18, 1904, *Gleason* (G). MINNESOTA. Anoka Co.: Moore Lake, sand dunes, *Rosendahl & Rydberg* 5135 (G, Mi). Wabasha Co.: open sand, *Weaver, Fassett & Hotchkiss* 3437 (NY). Winona Co.: Winona, Aug. 1898, *Holzinger* (Mi). Hennepin Co.: St. Anthony, 1861, *Hale* (M). IOWA. Benton Co.: Vinton, 1876, *Davis* (M). Muscatine Co.: Moscow, Aug. 1887, *Hitchcock* (M). NORTH DAKOTA. McHenry Co.: Denbigh, sand hills, Aug. 18, 1935, *Stevens & Kluender* (G). NEBRASKA. Holt Co.: Paddock, *Clements* 2784 (G, NY). Thomas Co.: near Plummer Ford, Dismal River, sand hills, *Rydberg* 1504 (G, NY). Brown Co.: Long Pine, Aug. 13, 1898, *Bates* (G). KANSAS. Hamilton Co.: sand hills, *Hitchcock* 466 (G, M, NY). OKLAHOMA. Payne Co.: sandy woods, *Oliver* 137 (NY). Creek Co.: Sapulpa, *Bush* 527 (G, M, NY). TEXAS. Dallas Co.: Dallas, 1878, *Reverchon* (M). Parker Co.: Weatherford, *Tracy* 7860 (G, M, Mo, NY). Andrews Co.: Shafter Lake, *Cory* 16614 (W). NEW MEXICO. Roosevelt Co.: 2 miles west of Bledsoe, Cochran Co., Texas, *Cory* 16525 (W). COLORADO. Morgan Co.: sand hill 4 miles south of Brush, *Ramaley & Ewan* 16326 (W).

7. EUPHORBIA MISSURICA Raf., Atlantic Journ. 1: 146. 1832; L. C. Wheeler, Proc. Biol. Soc. Wash. 53: 10. 1940.

Annual, glabrous; stems decumbent to erect, 5–65 cm. long, internodes of the main branches mostly 2–5 cm. long; leaf-blades broadly oblong to linear, mostly 1–3 cm. long, margin entire, base symmetrical to slightly inequilateral, apex obtuse to retuse, often mucronate, petioles 1–3 mm. long; stipules linear to triangular-subulate, distinct to partially united, entire to parted, glabrous, 1–1.5 mm. long; peduncles 1–11 mm. long; cyathia solitary but sometimes in terminal cymes of 3–5; involucre campanulate, 1.7–1.9 mm. in diam., glabrous outside, pubescent within at the summit; lobes triangular, about equaling to slightly exceeding the glands; glands subcircular to transversely oblong, 0.4–0.7 mm. in diam., cupped or folded; appendages white to pink, mostly conspicuous, glabrous, radially ovate to oblong-ovate, entire to slightly emarginate; fifth gland of one or two linear segments from $\frac{2}{3}$ as long as to about equaling the lobes, pubescent below; sinus U-shaped, little or not at all depressed; bracteoles from partly united below into a radial partition adnate below to the involucre to mostly free, mostly glabrous throughout, sometimes pubescent at the tips; staminate flowers 29–48 per cyathium; androphores glabrous, 1.4–1.9 mm. long; gynophore glabrous, well-exserted and reflexed; ovary glabrous, 3-lobed; styles ca. $\frac{1}{2}$ bifid, 0.7–0.9 mm. long; capsule strongly

3-lobed, 2–2.5 mm. long, from about as broad as long to broader than long; seeds ovoid to broadly ovoid-triangular, 1.5–2 mm. long, 1.1–1.4 mm. tangentially and radially, rotundly ovate to ovate-acute radially, angles faint to evident but blunt, coat mottled whitish and brown.

KEY TO VARIETIES

- Leaves broadly oblong to linear, apex obtuse to slightly retuse; ultimate branchlets mostly more or less capillary; seeds scarcely angled, micropylar area not markedly flattened and truncate; peduncles up to 11 mm. long, capillary.....a. var. *typica*.
 Leaves linear, apex truncate, mostly emarginate; ultimate branchlets not capillary; seeds mostly definitely angled, micropylar area obliquely truncate; peduncles up to 4 mm. long, stouter.....b. var. *intermedia*.

7a. *E. MISSURICA* Raf., Atlantic Journ. **1**: 146. 1832, var. **typica**. TYPE: "Arkansa", Nuttall (NY!; photographs G!, W!). A fairly typical, though young, specimen.

E. zygomphylloides Boiss., Cent. Euph., 10. 1860. TYPE: None of the original specimens from which Boissier drew his description has been seen. Consequently it seems inadvisable to select any type. The interpretation is certain since two of the numbers cited by Boissier have been seen at M.—*Chamaesyce zygomphylloides* (Boiss.) Small in Britton & Brown, Ill. Fl. No. U. S. & Canada ed. 2, **2**: 161. 1913.

E. arenaria Nutt., Trans. Amer. Philos. Soc., n. s. **5**: 171. 1837, not H.B.K., Nov. Gen. et Sp. **2**: 57 (quarto), 45 (folio). 1817. TYPE: "Arkansa", [Nuttall?] (Ph!, perhaps only isotype; photographs G!, W!). Engelm. & Gray, Bost. Journ. Nat. Hist. **5**: 260. 1845 (Pl. Lindh.).—*E. petaloidea* γ *Nuttallii* Engelm. in Emory, U. S. & Mex. Bound. Surv. **2** (1): 185. 1859.—*E. Nuttallii* (Engelm.) Small in Britton & Brown, Ill. Fl. No. U. S. & Can. **2**: 371. 1897.—*Chamaesyce Nuttallii* (Engelm.) Small, Fl. SE U. S., 711, 1333. 1903.—PLATE 666B.

Missouri, northwestern Arkansas, Kansas, south to Texas (MAP 13). Representative specimens seen: MISSOURI. Barry County: Eagle Rock, *Bush* 75 (M, NY). Cass Co.: July, 1865, *Broadhead* (M). Henry Co.: 3 miles northeast of Finney, *Steyermark* 15972 (M, Mo). Jackson Co.: Greenwood, *Bush* 10336A (M, NY); Dodson, *Bush* 506 (M, NY); Cockrell, *Bush* 6487A (M); Westport, Sept. 13, 1896, *K. K. Mackenzie* (M, Ph). Stone Co.: along east side of White River, south of mouth of Big Creek, north of Mill Creek, *Steyermark* 19642 (M, Mo). ARKANSAS. Carroll Co.: Beaver, *E. J. Palmer* 6333 (M). KANSAS. Ellis Co.: near Hays, *Bondy* 291 (M, Mo). Geary Co.: Junction City, *A. Brown* 178 (NY). Miami Co.: Paola, *Oyster* 7306 (NY). Osage Co.: Osage City, Aug., 1890, *Bodin* (NY). Riley Co.: Stony hills, *Norton* 468 (M, NY). OKLAHOMA. Comanche Co.: Fort Sill,

Clemens 11671 (M). Johnston Co.: Tishomingo, *E. J. Palmer* 6426 (M). Kiowa Co.: Wichita Mountains, July 27, 1891, *Sheldon* (M). Love Co.: Marietta, *E. J. Palmer* 10406 (M). Murray Co.: Platt National Park, Bromide Hill, *G. M. Merrill* 676 (NY). Ottawa Co.: near Miami, *G. W. Stevens* 2344 (NY). Pawnee Co.: Cleveland, *E. J. Palmer* 6379 (M). Payne Co.: 18 miles southeast of Stillwater, *Stratton* 206 (M). TEXAS. Austin Co.: Industry, July, 1844, *Lindheimer* (M, Ph). Bexar Co.: near Bracken, *Groth* 55 (NY). Burnet Co.: 3.1 miles north of Burnet, *Cory* 15617 (W). Dallas Co.: Dallas, *Bush* 1140 (M, NY). Gillespie Co.: Squaw Creek, *Jermy* (M). Grimes Co.: Anderson, *G. L. Fisher* 37217 (F). Hays Co.: San Marcos, *Stanfield* (NY). Houston Co.: Grapeland, *E. J. Palmer* 12832 (M). Parker Co.: Weatherford, *Tracy* 8124 (M, Mo, NY, Ph). Tarrant Co.: Fort Worth, *Tracy* 8168 (M, Mo, NY). Travis Co.: Austin, *Tharp* 2854 (US). Washington Co.: Mill Creek, *Lindheimer* 186 (M).

The Nuttallian rather than the James specimen is taken as type of *E. missurica* because the latter is a sterile seedling while the former *had* at least one cyathium from which Torrey drew the essential characters.

E. zygophylloides var. *cymulosa* Engelm. ex Boiss. in DC. Prod. **15** (2): 29. 1862. This probably belongs here but the only apparently authentic material seen bore this varietal name but was placed under another species.

The intergradation between var. *typica* and var. *intermedia* is complete and there are plants which cannot be definitely assigned to either. Examples of such intergradation are the following collections:

KANSAS. Barber Co.: Kiowa, *Rydberg & Imler* 662 (NY). Cowley Co.: no loc., Aug. 3, 1898, *M. White* (NY). OKLAHOMA. Woods Co.: Alva, *G. W. Stevens* 2960 (NY). TEXAS. Llano Co.: Llano, *E. J. Palmer* 10285 (M).

7b. EUPHORBIA MISSURICA Raf. var. INTERMEDIA (Engelm.) L. C. Wheeler, Proc. Biol. Soc. Wash. **53**: 11. 1940; based on *E. petaloidea* Engelm. β *intermedia* Engelm. in Emory, U. S. & Mex. Bound. Surv. **2** (1): 185. 1859. TYPE: Fort Pierre, Standley County, South Dakota, June 21, 1853, *F. V. Hayden* (M 149949!; photographs G!, W!).

E. petaloidea Engelm., l. c. TYPE: Forks of the Platte River, Lincoln County, Nebraska, July, 1858, *Henry Engelmann* (M 149966!; photographs G!, W!). Boiss. in DC. Prod. **15** (2): 28. 1862; Small in Britton & Brown, Ill. Fl. No. U. S. & Canada **2**: 371. 1897, seeds poor.—*Chamaesyce petaloidea* (Engelm.) Small, Fl. Se. U. S., 711, 1333. 1903.

E. petaloidea α *Nicolletii* Engelm. in Emory, U. S. & Mex. Bound. Surv. **2** (1): 185. 1859. TYPE: mouth of Powder River, Yellowstone, Prairie County, Montana, July, 1854, *F. V. Hayden* (M 202539!).

Minnesota, west to eastern Montana, south to Texas and New Mexico (MAP 13). Representative specimens seen: MINNESOTA. Ottertail Co.: Clitherall, July, 1897, *J. E. Campbell* (M, Mi, US); sandy beach of Ottertail Lake, *Moyle 2333* (Mi); sandy shore of Battle Lake, *Rosendahl 4177* (Mi). NORTH DAKOTA. Slope Co.: Bad Lands, Marmarth, *L. R. Moyer 741* (Mi). SOUTH DAKOTA. Fall River Co.: Hot Springs, *Hayward 546* (NY). Potter Co.: Forest City, Sept., 1892, *T. A. Williams* (M). NEBRASKA. Banner Co.: *Rydberg 353* (NY). Brown Co.: Long Pine, *Conklin* (NY). Cherry Co.: Valentine Lakes Refuge, Aug. 10, 1937, *Tolstead* (W). Custer Co.: Anselmo, *Webber 11* (NY). Dawson Co.: Near Gothenburg, *Heller 14300* (M). Deuel Co.: July, 1890, *Rydberg* (NY). Hooker Co.: on Middle Loup River, near Mullen, *Rydberg 1372* (NY). Scott's Bluff Co.: Kiowa Valley, *Rydberg 353* (NY). Sioux Co.: *Kramer 152* (M). Thomas Co.: Dismal River, *Webber 2* (NY). KANSAS. Clark Co.: 10 miles south of Ashland, *Rydberg & Imler 747* (NY). Graham Co.: Bogue, *Imler 63* (M, NY). Grant Co.: Ulysses, *C. H. Thompson 60* (M, NY). Hamilton Co.: Syracuse, *Rose & Fitch 17099* (NY). Kearney Co.: 13 miles south west of Lakin, *Rydberg & Imler 919* (M, NY). Logan Co.: *A. S. Hitchcock 467a* (M, NY). Osborne Co.: Osborne City, *Shear 126* (NY). Reno Co.: Hutchinson, *Smyth 45* (US). Riley Co.: *Norton 467* (M, NY). OKLAHOMA. Alfalfa Co.: near Cherokee, *G. W. Stevens 622* (M). Beaver Co.: north of Beaver, *E. J. Palmer 41887* (M). Cleveland Co.: Norman, *Emig 525* (M). Harper Co.: north of Rosston, *G. J. Goodman 2197* (M). Payne Co.: 18 miles southeast of Stillwater, *Stratton 656* (M). TEXAS. Bailey Co.: 2 miles south of Muleshoe, *Ferris & Duncan 3422* (M, NY). Callahan Co.: Baird, *E. J. Palmer 14542* (M). Eastland Co.: 3½ miles east of Ranger, *Cory 13130* (W). Grayson Co.: Denison, *Stuart 147* (M). Hall Co.: Estelline, *Reverchon 3799* (M). Hartely Co.: 5.3 miles southwest of Middlewater, *Cory 16313* (W). Hemphill Co.: prairie north of Canadian, Aug. 10, 1900, *Eggert* (M). Hood Co.: Granberry, *Reverchon 3797* (M). Mitchell Co.: Colorado, *Tracy 8121* (M, Mo, NY). Motley Co.: 16.4 miles north of Matador, *Cory 16037* (W). Wilbarger Co.: Pease River near Vernon, *Ferris & Duncan 3353* (M). WYOMING. Natrona Co.: Alcova, *Goodding 161* (M, NY). COLORADO. Boulder Co.: Boulder, *Penard 301* (NY). Cheyenne Co.: S1, T14S, R51W, *Owenby 1350* (M, NY). Denver Co.: Denver, *Jones 292* (M). Huerfano Co.: La Veta, *Clements 152* (NY). Morgan Co.: 4 miles south of Brush, *Ramaley & Ewan 16325* (W). Weld Co.:

Crow Creek, *Pollard 92* (NY). NEW MEXICO. Chaves Co.: 20 miles south of Roswell, *F. S. & E. S. Earle 279* (M, NY). Lea Co.: sandhills near Loving, *Standley 40362* (US). Union Co.: on the Cimarron, *Wislizenus 464* (M).

8. *EUPHORBIA GRACILLIMA* S. Watson, Proc. Amer. Acad. Arts and Sci. **21**: 438. 1886. TYPE: Hacienda San Miguel, near Batopilas, southwestern Chihuahua, Mexico, Aug., 1885, *Ed. Palmer 68* (G!). (Watson published the locality as "Hacienda San Jose" which seems to have been a *lapsus calami*.)—*Chamaesyce gracillima* (S. Wats.) Millsp., Field Mus. Pub. Bot. **2**: 409. 1916.

Glabrous erect annual 8–18 cm. tall; main stem up to 2 mm. thick at base, soon forking repeatedly into branches with internodes up to 2 cm. long below, progressively shorter toward the tips, ultimate branchlets ca. 0.1 mm. thick; leaves 2–15 mm. long; blades narrowly linear, margin entire, revolute; petioles 0.3–0.6 mm. long; stipules entire, distinct, glabrous, linear-subulate, 0.3–0.5 mm. long; cyathia solitary in the bifurcations; peduncles 0.3–0.9 mm. long; involucre turbinate, tapering to the peduncle, 0.5–0.7 mm. in diam., glabrous outside, with short hairs within at the summit; lobes triangular, acuminate, slightly exceeding the glands, ciliate on the margin; glands transversely oval, slightly cupped, 0.15–0.3 mm. long; appendages radially as long as glands or longer, slightly tapering and obtuse to bifid; 5th gland filiform, ca. $\frac{1}{2}$ as long as the lobes or wanting; sinus U-shaped, little depressed; bracteoles linear, entire, glabrous or with a few short hairs above, slightly shorter than the androphores, one united to the involucre beneath each gland; staminate flowers 1–2 per fascicle, 5–12 per cyathium; androphores glabrous, included, 0.6–0.7 mm. long; gynophore glabrous, soon exerted and reflexed; ovary 3-angled, glabrous; styles ca. 0.5 mm. long, bifid; capsules glabrous, ca. 1.3 mm. long, sharply 3-angled, slightly wider below the equator, base truncate; seeds tetragonal, sharply angled, 1–1.1 mm. long, ca. 0.6 mm. radially and tangentially, radially narrowly ovate, acute, base truncate, facets all smooth, coat white but very thin, the brown testa scarcely obscured, with longitudinal rows of reticulations.—PLATE 667A.

Arizona, south to Sinaloa, east to the Pacific slope of Chihuahua (MAP 10). Representative specimens seen: ARIZONA. Pima County: Recreation Center, Tucson Mountains, *Shreve 6320* (Sh); Sells, *Harrison & Kearney 8037* (NY); near Tucson, *Harrison 8142* (A, US). MEXICO. SONORA: Bajada south of Las Trincheras, *Shreve 6375* (Sh); hills and mesas near Altar, Aug. 12, 1884, *Pringle* (G, US); San Bernardo, gravelly soil, alt. 250–300 m., *Pennell 19730* (US); Hermosillo, *M. E. Jones 22604* (possibly *21605*) (G); Chorihoa, Rio Mayo, in the sand, river bank, *Gentry*

1608 (G). SINALOA: Culiacan, Sept. 8, 1904, *T. S. Brandegee* (G); Culiacan, Oct., 1904, *T. S. Brandegee* (US).

9. *EUPHORBIA REVOLUTA* Engelm. in Emory, U. S. & Mex. Bound. Surv. **2** (1): 186. 1859. TYPE: between Santa Fe and Moro (Mora?) River, in the mountains about the base of trees and shrubs, New Mexico, Aug. 10–16, 1847, *A. Fendler* 789 (M 200216!; photographs G!, W!; ISOTYPE G!). Boiss., Icon. Euph., t. 13. 1866.—*Chamaesyce revoluta* (Engelm.) Small, Fl. SE U. S., 711, 1333. 1903.

Glabrous erect annual 3–20 cm. tall: main stem up to 2 mm. thick at the base, soon forking repeatedly into branches with internodes up to 3 cm. long below, progressively shorter toward the tips, ultimate branchlets 0.15–0.25 mm. thick; leaves 2.5–26 mm. long, largest leaves on any plant mostly over 1 cm. long; blades narrowly linear, margin entire, revolute; petioles 0.5–1.5 mm. long; stipules entire, distinct, glabrous, linear-subulate, attenuate, 0.3–0.8 mm. long; cyathia solitary in the bifurcations; peduncles 0.5–1.4 mm. long; involucre broadly obconical to turbinate, tapering to the peduncle, 0.9–1 mm. in diam., glabrous outside, with short hairs around the summit inside or glabrous; lobes triangular, acuminate, slightly to markedly exceeding the glands; glands subcircular, 0.15–0.3 mm. in diam., slightly cupped; appendages from a mere swelling beneath the gland to radially elongated and nearly as long as the gland; 5th gland linear, ca. half as long as the lobes; sinus V-shaped, little depressed; bracteoles linear, entire, or bifid, with a few short hairs above or glabrous, ca. $\frac{2}{3}$ as long as the androphores, one united to the involucre beneath each gland; staminate flowers 1–3 per fascicle, 5–10 per cyathium; androphores 0.7–0.9 mm. long, glabrous, included; gynophore glabrous, soon exerted and usually reflexed; ovary 3-angled, glabrous; styles ca. 0.5 mm. long, entire or sometimes very shortly bifid, spreading, with erect tips; capsule glabrous 1.3–1.4 mm. long, sharply 3-angled, slightly wider below the equator, base truncate; seeds triangular-pyramidal to tetragonal, sharply angled, 1–1.3 mm. long, 0.7–0.9 mm. tangentially, 0.6–0.8 mm. radially, radially ovate-acute with truncate base, ventral facets concave and nearly smooth or face rounded, traversed by two (rarely 1) transverse rounded ridges, angles sharp, the ridges and valleys passing through them but slightly, or not at all, coat white, microreticulate, the brown testa sometimes showing through.—PLATE 667B.

Colorado, New Mexico, Chihuahua, and Arizona (MAP 8). Representative specimens seen: COLORADO. Fremont County: Canyon City, *Clements* 272 (NY); rocky hills near Canyon City, *Biltmore Herb.* 6415 (US). NEW MEXICO. San Miguel-Guadalupe County: between Anton Chico and Las Vegas, *Rose & Fitch* 17638 (M, NY, US). Sandoval-Bernalillo County: Sandia

Mountains near La Luz Mine, *Ellis 335* (US). Sante Fe Co.: Santa Fe, *Rose & Fitch 17699* (M, NY, US). Lincoln County: Gray, *Skehan 118* (NY, US). Sierra County: 1 mile west of Hillsboro, *Metcalf 1267* (G, M, NY, US). Doña Ana County: Little Mountain near Las Cruces, *Wooton 346* (M, US); west of the Organ Mountains, Sept. 1, 1908, *Wooton & Standley* (US). Grant County: Fort Bayard, *Mulford 943* (M, NY). ARIZONA. Mohave County: Kingman, Aug. 13, 1911, *Wooton* (US). Cocoino County: northern foothill region of San Francisco Peaks, *Leiberg 5969* (US). Yavapai County: Clarksdale, *W. W. Jones C287* (G). Pima County: Davidson's Canyon, Sept. 8, 1884, *Pringle* (US). Gila County: Pinal Creek, *Harrison & Kearney 8291* (G). Santa Cruz County: Nogales, *Peebles, Harrison & Kearney 4589* (US). Cochise County: Bisbee, Oct. 4, 1890, *Lloyd* (G, US); Cave Creek, Chiricahua Mountains, *Harrison & Kearney 6164* (G). MEXICO. CHIHUAHUA: near Colonia Garcia in the Sierra Madre, *Townsend & Barber 284* (M, US); hills near Chihuahua, *Pringle 999* (M); 6 miles east of Piloncillo, road from Jimenez to Camargo, via El Arroyo del Fierro, *I. M. Johnston 7874* (G).

Chas. Wright no. 1830 would have been taken as the type collection, as it was more widely distributed in herbaria than *Fendler 789*, if it were not for the fact that Asa Gray, in making up Wright's sets, combined two of Wright's collections under *no. 1830*. This fact is inferred from the presence in the pocket on one of the two sheets of this *no. 1830* at the Gray Herbarium of two of Wright's original collection-numbers. Omitting the details of the method of elimination, the data for the numbers are "298. Stony hills at the Copper Mines, Aug. 18, 1851", New Mexico; and "524. On the Sonoita near Deserted Rancho, Sept. 15, 1851", Santa Cruz County, Arizona.

10. *EUPHORBIA FLORIDA* Engelm. in Emory, U. S. & Mex. Bound. Surv. **2** (1): 189. 1859. TYPE: Valley west of the Chiricahua Mountains, Cochise County, Arizona, Sept. 8, 1851, *C. Wright 1829* (M 149820!; photographs G!, W!; ISOTYPE G!). Boiss., Icon. Euph., t. 14. 1866.—*Chamaesyce florida* (Engelm.) Millsp., Field Mus. Pub. Bot. **2**: 409. 1916.

Glabrous erect annual 15–65 cm. tall; stem mostly branched from the base, rarely simple, 1–6 mm. thick at the base, internodes up to 7 cm. long, gradually shortened toward the stem tips; leaves linear, 1.5–6 cm. long or the uppermost much reduced in late season, margin remotely and sharply serrulate, revolute at least on drying, petioles 1.5–2 mm. long; stipules 1–2 mm. long, distinct, linear-subulate, mostly with one or two

linear lobes near the base, glabrous or sometimes with a few cilia; cyathia solitary at the nodes or somewhat clustered at the branch-tips; peduncles up to 6.5 mm. long but mostly much shorter; involucre campanulate, 1.4–2 mm. in diam., glabrous without, densely pubescent above inside; lobes slightly exceeding the glands, triangular, acuminate, entire or the distal with one or two erect teeth on the sides and the proximal sometimes many-toothed; glands circular or nearly so but often folded together, 0.5 mm. in diam.; appendages conspicuous, white, often rubescent, obovate to elliptic to elliptic-oblong (radially) 1–2.8 mm. long, glabrous; 5th gland filiform, ca. $\frac{2}{3}$ as long as to nearly equaling the lobes; sinus U-shaped, slightly depressed; bracteoles forming a radial partition opposite the glands, adnate to the involucre for about half its length, united to the gynophore at the very base, upper half of 3–6 filiform ciliate segments equaling the androphores; staminate flowers 9–12 per fascicle, 37–58 per cyathium; androphores 1.9–3 mm. long, glabrous, included; gynophore glabrous, soon exerted and reflexed; ovary glabrous, roundly 3-lobed; styles bifid $\frac{1}{2}$ – $\frac{3}{4}$ distance to the base, 1–1.3 mm. long; capsule glabrous, oblate-spheroidal and nearly symmetrical, rounded-triangular in horizontal cross section, ca. 2.5 mm. long; seeds subtetragonal, lateral and dorsal angles slightly winged, ventral angle very low, 1.7–2 mm. long, 1.3–1.6 mm. radially, 1.4–1.7 mm. tangentially, radially broadly ovate, base truncate, facets smooth except for two (rarely three on dorsal facets) low transverse ridges which do not pass through the angles, occasionally the ridges irregular; white cellularly microreticulate coat mostly thick enough to make the seeds a dull white to sordid.—PLATE 667C.

Southern Arizona, south to Sinaloa (MAP 17). Representative specimens seen: ARIZONA. Yavapai Co.: Fort Whipple, Rio Verde, *Coues & Palmer 531* (M). Gila Co.: Rock Creek, *Collom 314* (M, US). Graham Co.: Camp Grant, *Ed. Palmer 237* (M). Pima Co.: near Baboquivari Canyon, *Peebles, Harrison & Kearney 2773* (M, US); foothills of Santa Catalina Mountains, July 30, 1881, *C. G. Pringle* (M, US); Baboquivari Mountains, *M. E. Jones 24862* (G, NY); Santa Rita Forest Reserve, *Griffiths & Thornber 8* (NY, US); small range reserve near Tucson, *Griffiths 6172* (US); common on range reserve, Wilmot, *Thornber 136* (M). Cochise Co.: San Bernardino Ranch, Mex. Boundary line, *Mearns 611* (US); Rucker Valley, *Lemmon 469* (G); Bowie, *M. E. Jones 4263* (I, NY, US). MEXICO. SONORA: arroyo, Los Conejos, Rio Mayo, *Gentry 1119* (G, W); La Cruz de las Cañadas, *Lloyd 463* (G); high mountains, Guaymas, Sept., 1887, *Palmer 209* (G, US); Alamos, *Palmer 640* (G, US); San Bernardo, Rio Mayo, *Gentry 1148* (Sh); 5 miles east of Garumbullo, *Wiggins 6124* (US). SINALOA: Cofradia, vicinity of Culiacan, Oct. 21, 1904, *T. S. Brandege* (G).

11. *EUPHORBIA TRACHYSPERMA* Engelm. in Emory, U. S. & Mex. Bound. Surv. **2** (1): 189. 1859. TYPE: low damp soil near the San Pedro River, Cochise County, Arizona, Sept. 9, 1851, *Wright 1832* (M 200493!; photograph G!, W!; ISOTYPES G!, NY!). —*Chamaesyce trachysperma* (Engelm.) Millsp., Field Mus. Pub. Bot. **2**: 412. 1916.

Erect glabrous annual 15–40 cm. tall; stems mostly branching from the base, 0.7–3 mm. thick, internodes up to 6 cm. long; blades linear, lanceolate, ovate-lanceolate and obtuse, to oblong, 1–4 cm. long, margin serrulate at least at the apex; petioles 1–2 mm. long; stipules distinct, 1–1.4 mm. long, bearing a few cilia or glabrous, mostly divided above into 3 segments, the middle greatly exceeding the two lateral; cyathia solitary at the nodes; peduncles up to 5 mm. long but mostly shorter; involucre campanulate, 1.7–2.1 mm. in diam., 3–3.5 mm. long, glabrous outside, shortly hairy on upper half inside; lobes broadly triangular, acuminate, slightly to markedly exceeding the glands; glands transversely oval to subcircular, more or less folded, 0.5–0.7 mm. long; appendages white, about half as wide as to a little wider than the glands, entire; fifth gland filiform, ca. $\frac{2}{3}$ as long as lobes; sinus broadly V-shaped, not depressed, with a tuft of hair in the fundus; bracteoles forming a radial partition adnate to the lower half of the involucre and completely surrounding the inner side of the fascicles at the base, parted above into 3 or 4 linear, shortly hairy segments about equaling the androphores; staminate flowers 10–13 per fascicle, 54–63 per cyathium; androphores glabrous, 2–2.8 mm. long; gynophore glabrous or rarely with a few hairs, soon exerted and reflexed; ovary glabrous, roundly 3-lobed; styles 0.7–1 mm. long, bifid to the middle; capsule glabrous, 3.1–3.3 mm. long, very short-cylindric but slightly narrower above, sharply 3-angled, base truncate, apex obtuse; seeds grayish-brown, quadrangular, dorsal and lateral angles sharp, ovate to narrowly ovate radially, base truncate, apex acute, 2–2.3 mm. long, tangentially 1.3–1.7 mm., radially 1.3–1.6 mm., ventral facets plane or slightly concave, dorsal facets convex, surface of seed slightly rough with scattered irregular pits, angles irregularly notched, or ventral facets with two or three faint transverse grooves.—PLATE 667D.

Southern Arizona, south to Sonora (MAP 21). Representative specimens seen: ARIZONA. Yuma Co.: west of La Paz, 1869, *Ed. Palmer 20* (US). Pima Co.: Tucson, 1867, *Dr. Smart* (US). Pinal Co.: Maricopa, *Thornber 9141* (T). MEXICO. SONORA: high mesas, Guaymas, Sept., 1887, *Ed. Palmer 183* (G, US); in an enclosure, Guaymas, Oct., 1887, *Ed. Palmer 319* (G, US); Ciudad Obregon, *Gentry 266* (G).

12. *EUPHORBIA HYSSOPIFOLIA* L., Syst. Nat. ed. 10, **2**: 1048. 1759. TYPE: Probably from Jamaica, *Patrick Browne* (Linnaean

Herb., not seen; photograph G!; rephotograph W!). The narrow-leaved extreme. Thellung in Ascherson & Graebner, Syn. Mitteleur. Fl. **7**: 432. 1917.—*Anisophyllum hyssopifolium* (L.) Haw., Syn. Pl. Succ., 161. 1812; Klotzsch & Garcke, Abh. Akad. Berlin, Phys. **1859**: 35. 1860.—*E. hypericifolia* L. “ β *hyssopifolia*, L.”, Griseb., Fl. Brit. W. I. Is., 54. 1859; published as quoted.—*E. brasiliensis* Lamarck var. *hyssopifolia* (L.) Boiss. in DC. Prod. **15** (2): 24. 1862.—*Chamaesyce hyssopifolia* (L.) Small, Journ. N. Y. Bot. Gard. **3**: 429. 1905.

E. brasiliensis Lamarck sensu Boiss. in DC. Prod. **15** (2): 24. 1862 and most subsequent authors.—*Chamaesyce brasiliensis* (Lamarck) Small, Fl. Se. U. S., 712, 1333. 1903, sensu Small, l. c., and subsequent publications in part.

E. Jonesii Millsp., Pittonia **2**: 89. 1890. TYPE: Bowie, Cochise County, Arizona, Sept. 17, 1884, M. E. Jones 4247 (F 196592!; photographs G!, W!; ISOTYPES O!, US!). The large-seeded western facies of the species.—*Chamaesyce Jonesii* (Millsp.) Millsp., Field Mus. Pub. Bot. **2**: 410. 1916.

E. stenomeres Blake, Contr. U. S. Nat. Herb. **24**: 13. 1922. TYPE: Open hillsides wooded with pine, trail from Los Amates to Izabal, Department of Izabal, Guatemala, May 31, 1919, S. F. Blake 7776 (US 989628!, photograph G!, W!). Appears to be a good match for the type of *E. hyssopifolia* L.

Annual or sometimes perhaps overwintering; stems mostly erect, mostly glabrous, sometimes sparsely pilose in Arizonan plants, simple below or sometimes branched from the base, 8–60 cm. tall, mostly 1–3 mm. thick, internodes mostly 1–3 cm. long, rarely up to 6; leaves 5–30 mm. long, lanceolate and often falcate to oblong, all leaves often small in over-wintering plants, mostly glabrous, sometimes sparsely pilose especially toward the base, base inequilateral, margin usually serrate; petioles 1–1.5 mm. long; stipules mostly united, for the most part triangular and as broad as high with slightly lacerate and occasionally ciliate margin, toward the branch-tips sometimes partly distinct, narrowly triangular, up to ca. 1 mm. long, with erect linear teeth; cyathia solitary in the upper bifurcations and in few-flowered leafy cymes; peduncles 0.5–2 mm. long, glabrous; involucre obconical to obconic-campanulate, tapering to the peduncle, 0.7–0.9 mm. in diam., glabrous outside, glabrous inside except at the base of the lobes and on the stipes; lobes triangular, attenuate, slightly exceeding the glands, distal mostly entire, proximal often with erect linear teeth; glands circular to broadly elliptical transversely, 0.15–0.3 mm. long; appendages white or sometimes reddish in age, glabrous, entire, $\frac{1}{3}$ as wide as to twice as wide as the gland, semilunate; fifth gland linear, ca. $\frac{1}{2}$ as long as the lobes; sinus U-shaped, slightly depressed; bracteoles forming a very narrow radial partition adnate to the involucre below

each gland, free portion parted into few linear subglabrous segments; staminate flowers 4–15 per cyathium; androphores glabrous, 0.9–1.3 mm. long; gynophore glabrous, well-exserted and usually reflexed; ovary glabrous, strongly 3-lobed; styles glabrous, 0.5–0.9 mm. long, bifid $\frac{1}{2}$ – $\frac{2}{3}$ to base; capsule glabrous, broadly ovoid, wider below the equator, 1.6–2.1 mm. long, strongly and subacutely 3-lobed; seeds ovoid-subquadrangular, 1–1.4 mm. long, 0.7–1.1 mm. tangentially and radially, radially ovate to elliptical-ovate, ventral facets slightly concave to slightly convex, dorsal facets convex, both with very shallow depression from half as wide as to as wide as the facet, separated by very low smooth ridges, chocolate-brown to grayish-white.—PLATE 656D.

South Carolina, Florida, Louisiana, western Texas, southern New Mexico, and Arizona; generally distributed south to temperate South America (MAP 38). Representative specimens from the United States: SOUTH CAROLINA. Colleton Co.: 3 miles south of Walterboro, *Wiegand & Manning 1817* (G). FLORIDA. Alachua Co.: campus, Gainesville, *O'Neill 458* (US). Lake Co.: near Eustis, *Nash 930* (G, M, NY, US). Orange Co.: Orlando, *Curtiss 6670* (G, M, US). Dade Co.: Miami, *Demaree 10214* (M, US); Arch Creek Prairie, *J. K. Small, Mosier & G. K. Small 6800* (NY, US); Buena Vista, *Moldenke 328* (M, NY, US). Lee Co.: Myers, *A. S. Hitchcock 324* (G, M, NY, US); near Punta Rassa, *J. P. Standley 307* (G, M, US); near Fort Myers, *P. C. Standley 12656* (US). Manatee Co.: Manatee, *Webber 26* (M). Hillsborough Co.: *Fredholm 6280* (G, US). Pinellas Co.: St. Petersburg along beach, *Tidestrom 7028* (US); near St. Petersburg, *Deam 2758* (G, M). Franklin Co.: cultivated at Apalachicola, *Biltmore Herb. 3844^a* (G, M, NY, US). LOUISIANA. Plaquemines Co.: Port Eads, *Lloyd & Tracy 213* (NY). TEXAS. Jeff Davis Co.: Fort Davis, Davis Mountains, *Ferris & Duncan 2698* (M, NY). Brewster Co.: Alpine, *Hughes 22* (NY); Oak Canyon, Chisos Mountains, *Cory 7005* (G); Lower Green Gulch, Chisos Mountains, *Sperry 450* (US); Sunny Glenn, *Sperry T244* (US). NEW MEXICO. Doña Ana Co.: Organ Mountains, *Wooton 609* (M, NY, US); east side Organ Mountains, Aug. 17, 1895, *Wooton* (NY, US); Van Pattens, Organ Mountains, Sept. 10, 1899, *Wooton* (NY, US). Luna Co.: Cedar Springs, Florida Mountains, *Mulford 1037a* (M, NY). ARIZONA. Yavapai Co.: Camp Lincoln, 1869, *Ed. Palmer* (US). Maricopa Co.: Mesa, *Peebles, Harrison & Kearney 224* (US). Gila Co.: Sierra Ancha, *Harrison & Kearney 5682* (A, US). Graham Co.: near Safford, *Maguire, Richards & Moeller 16018* (G, I). Pima Co.: Tucson, May 1, 1894, *Toumey* (NY, US); Santa Cruz Valley near Tucson, June 20, 1881, *Pringle* (G, M, NY, US); Baboquivari Mountains, *M. E. Jones 24859* (G, NY); Santa Catalina Mountains, *Harrison*

& Kearney 8045 (US). Santa Cruz Co.: Nogales, Peebles, Harrison & Kearney 4590 (US); Nogales, Peebles & Harrison 4692 (US). Cochise Co.: near Fort Huachuca, Wilcox 320 (US); Portal, Chiricahua Mountains, Eggleston 10725 (US); Fort Lowell, Thornber 209 (M, NY).

E. brasiliensis Lamarck, Encyc. Meth. Bot. 2: 423. 1786, has generally been considered as conspecific with *E. hyssopifolia* L. However, the ovary and capsule of *E. hyssopifolia* and what has been known as *E. brasiliensis* are noted for being quite glabrous. Examination of two fragments of *E. brasiliensis* at F, one supposedly from the type, collected by Commerson in Brazil, and the other from an isotype both at Herb. Mus. Paris, shows that Lamarck did not err when he wrote "L'ovaire est chargé de poils blancs." The hairs are mainly on the backs of the carpels and seem to be at least partially deciduous. The rather young seeds do appear to be identical with those of *E. hyssopifolia*. The type collection of *E. brasiliensis* may represent merely a trivial variant of *E. hyssopifolia* but whatever the entity, it does not occur in the United States or Canada.

The plants of Texas, New Mexico, and Arizona are generally larger-seeded than those of South Carolina, Florida, and Louisiana. The western plants also tend to be slightly vestite. The absence of the species in southern Texas and its presence in western Texas further suggest that there are two distinct races involved. However, since the differences are so trifling when many specimens are examined and Mexican specimens seem to be intermediate, it seems futile to try to separate as named categories the northern tips of two lines of northward migration of a widespread and variable tropical species. Examination of the total variation of the species is necessary before a proper evaluation of any of its facies can be made.

13. EUPHORBIA MACULATA L., Sp. Pl. 1: 455. 1753. TYPE: "*America septentrionalis*" (Linnaean Herb., not seen; photograph G!; rephotograph W!). A good representative of the species as here interpreted. Linnaeus, Mantissa Altera, 392. 1771; Elliott, Sketch Bot. So.-Car. & Georgia 2: 654. 1824, and probably other early writers.—*E. hypericifolia* L. β . *E. maculata* (L.) Lam., Encyc. Meth. Bot. 2: 422. 1786.—*Tithymalus maculatus* (L.) Moench. Meth. Pl., 666. 1794.—*Anisophyllum maculatum* (L.) Haw., Syn. Pl. Succ., 162. 1812.—*E. hypericifolia* L. var. *maculata* (L.) Raf., Med. Fl. U. S. 1: 183. 1828 (basynym

given above in synonymy, and the plant described belongs here). *Xamesike maculata* Raf., Aut. Bot., 97. 1840, basonym indicated only as "Euph. d[itt]o. O.[mnes]."—*E. trinervis* Bertoloni, Fl. It. 5: 37. 1842, a renaming of "*E. maculata* Mant. alt. p. 392" under the misapprehension that Linnaeus' use there was a misapplication.—*Chamaesyce maculata* (L.) Small, Fl. Se. U. S., 713, 1333. 1903.

E. nutans Lag., Gen. et Sp. Pl., 17. 1816. TYPE: "Habit.[at] in N.[ova] H.[ispania]" (Perhaps at Madrid judging by Alph. DC., Phytographie, 426. 1880). See discussion after citation of specimens.—*Chamaesyce nutans* (Lag.) Small, Fl. Se. U. S. 712, 1333. 1903.

E. Preslii Guss., Fl. Sic. Prod. 1: 539. 1827. TYPE: Palermo, Italia, *Todaro* (Praha?; fragment F!). May be only isotype material at best but marked in Millspaugh's hand "From the type material Herb. Praag.". The specimen belongs in this entity. Boiss. in DC. Prod. 15 (2): 23. 1862.—*Chamaesyce Preslii* (Guss.) Arthur, Torreyia 11: 260. 1912.

E. hypericifolia L. var. *communis* Engelm. in Emory, U. S. & Mex. Bound. Surv. 2 (1): 188. 1859. TYPE: New Mexico, 1851–2, *C. Wright 1842* (M?, not found; ISOTYPES NY!, US!). Engelm. in Chapman, Fl. So. U. S., 403. 1865. *Wright 1842* was a mixture of two species (see under 16a) and the locality printed on the labels of these collections is general and often *erroneous*.

Chamaesyce Lansingii Millsp., Field Mus. Pub. Bot. 2: 376. 1913. TYPE: paved ditches, 56th Street, Chicago, Cook County, Illinois, Aug. 6, 1898, *O. E. Lansing Jr. 402* (F 196688!).

"**E.** (bezw. **Chamaesyce**) [*nutans* var.?] **pseudonutans**", Thellung in Ascherson & Graebner, Syn. Mitteleur. Fl. 7: 431. 1917. See discussion of this after citation of specimens. "**E.**" stands for *Euphorbia*.

E. hypericifolia L. *sensu* American authors in large part.

Many extralimital synonyms listed by Boissier in DC. Prod. 15 (2): 23. 1862, and Thellung in Ascherson & Graebner, Syn. Mitteleur. Fl. 7: 426–432. 1917, are omitted here since no authentic material has been available.

Annual; stems mostly erect, mostly simple below, 8–80 cm. tall (or taller according to collector's notes), 1–4 mm. thick, internodes mostly 1–4 cm. long, crisply pubescent at least on a line and on the young tips, then becoming glabrous; leaves oblong-lanceolate to oblong or even occasionally falcate-lanceolate, 8–35 mm. long, mostly glabrous above, sometimes sparsely long-pilose, usually long-pilose beneath especially toward the base, base inequilateral, margin serrate; petioles 1–1.5 mm. long; stipules mostly united, mostly broadly triangular-acuminate, up to ca. 1 mm. long, margin ciliate, slightly toothed, uppermost often nearly distinct, narrowly triangular, margin

with erect linear teeth; cyathia both solitary at the nodes and clustered in cymes; peduncles 0.5–5 mm. long, glabrous; involucre glabrous outside, sparsely pubescent inside on the bases of the lobes and stipes, obconical to obconical-campanulate, tapering to the peduncle, 0.7–1 mm. in diam.; lobes triangular, slightly exceeding the glands, the distal mostly entire, the proximal often with erect linear teeth; glands long-stipitate, circular to broadly transversely elliptical, 0.1–0.3 mm. in diam.; appendages rudimentary to 0.5 mm. long, oval, white to reddish, glabrous, entire or bluntly lobed; fifth gland linear, ca. $\frac{2}{3}$ as long as lobes; sinus U-shaped, slightly depressed; bracteoles forming a slender segment below each gland, united to the involucre below, entire or with two to four filiform glabrous or sparsely hairy divisions above; staminate flowers 5–11 per cyathium; androphores glabrous, 1–1.1 mm. long; gynophore glabrous, well-exserted and usually reflexed; ovary glabrous, roundly 3-angled; styles $\frac{1}{3}$ – $\frac{1}{2}$ bifid, 0.6–1 mm. long; capsule glabrous, broadly ovoid, wider below the equator, 1.9–2.3 mm. long, strongly and subacutely 3-lobed; seeds ovoid-subquadrangular 1.1–1.6 mm. long, 0.9–1.1 mm. tangentially and radially, elliptic-ovoid radially, facets convex, with a finely rippled surface, coat dark grayish, brown or sometimes pale gray.—PLATES 656B and 668B.

Ontario; all states east of the Mississippi River except Maine; Minnesota and South Dakota south to northern Florida and Texas; introduced in California and Washington; southward to South America; and introduced in the Old World (MAP 10). Representative specimens seen from the United States and Canada: NEW HAMPSHIRE. Belknap Co.: Meredith, Aug., 1894, *Carter* (NE). Strafford Co.: near Dover, *Hodgdon 677* (NE). Hillsborough Co.: Milford, Sept. 5, 1902, *J. A. Wheeler* (NE). VERMONT. Rutland Co.: Brandon, Sept. 11, 1909, *Dutton* (M); Wallingford, Aug. 3, 1907, *Kennedy* (G). MASSACHUSETTS. Middlesex Co.: Concord, Sept., 1857, *Hoar* (NE); Somerville, Aug. 31, 1899, *Flynn* (NE). Hampshire Co.: South Hadley, 1887, *Cook* (US). Berkshire Co.: Pittsfield, Sept. 23, 1899, *Hoffmann* (NE). CONNECTICUT. Hartford Co.: Southington, *Bissell 529* (NE). Litchfield Co.: North Canaan, Aug. 17, 1910, *Woodward* (NE). Middlesex Co.: Middletown, *Blewitt 850* (NE). New Haven Co.: Oxford, Sept. 28, 1916, *Harger* (Ph). Fairfield Co.: Fairfield, Aug. 11, 1893, *Eames* (Ph). NEW YORK. Orange Co.: Newburgh, Sept. 8, 1895, *Pollard* (US). Westchester Co.: Worthington, *Pennell 8282* (Ph). Warren Co.: Lake George, 1882, *Vasey* (US). Tompkins Co.: Ithaca, July 20, 1893, *Wiegand* (US). Dutchess Co.: near Clove, *Standley & Bollman 12243* (US). New York Co.: Bronx Park, Sept. 3, 1896, *Nash* (Ph). Suffolk Co.: Wading River, *Miller 119* (US). NEW JERSEY. Middlesex Co.: Stelton, *Mackenzie 2857* (M, US).

Somerset Co.: Peapack, *Perry* (M). Hunterdon Co.: Stockton, on Delaware River, *Benner 7008* (PhB). Ocean Co.: near Bay Head, Sept. 21, 1914, *Lighthipe* (M). Camden Co.: Oaklyn, Sept. 22, 1922, *Bassett* (PhB). Burlington Co.: north of Birmingham, *Long 19622* (PhB). Gloucester Co.: Sewell, *Long 17121* (PhB). Salem Co.: Centerton, *Long 32522* (PhB). Atlantic Co.: northwest of Bakersville, *Long 15194* (PhB). Cumberland Co.: south of Millville, *Fogg 5934* (PhB). Cape May Co.: Cape May City, Aug. 26, 1918, *Stone* (PhB). PENNSYLVANIA. Luzerne Co.: above Nescopeec on Susquehanna River, *Heller 14207* (M). Northampton Co.: Easton, Sept. 19, 1895, *Porter* (US). Lehigh Co.: south of Walbert's station, *Pretz 11116* (PhB). Allegheny Co.: Sharpsburg, Aug. 31, 1902, *Hatry* (Ph). Lebanon Co.: South Mountain, *Heller 668* (US). Lancaster Co.: Lancaster, Sept. 26, 1901, *Heller* (US). Philadelphia Co.: Gibson's Point, *McElwee 691* (Ph). Chester Co.: West Chester, Aug. 31, 1844, *Darlington* (M). DELAWARE. Queen Anne's Co.: Centreville, Aug. 14, 1868, *Commons* (Ph). MARYLAND. Montgomery Co.: above Cabin John, *Painter 1027* (M). Prince Georges Co.: Laurel, Sept. 12, 1897, *Knowlton* (US). Calvert Co.: Chesapeake Beach, *House 1451* (US). Wicomico Co.: Salisbury, *Tidestrom 7460* (US). Worcester Co.: Snow Hill, *Moldenke 6632* (NY). DISTRICT OF COLUMBIA. Washington, Rock Creek, near west gate of zoo, *Pollard 648* (US). WEST VIRGINIA. Ritchie Co.: Laurel Junction, Sept. 12, 1879, *Smith* (US). Upshur Co.: near Buckhannon, July 29, 1895, *Pollock* (US). VIRGINIA. Page Co.: near Luray in the Blue Ridge, *Steele 37* (US). Alexandria Co.: Glencarlyn, *Dewey 40* (US). Fairfax Co.: Clifton, Oct. 10, 1884, *Ward* (US). James City Co.: Williamsburg, *Grimes 4433* (NY). Campbell Co.: near Lynchburg, Aug. 24, 1900, *U. C. Smith* (Ph). Amherst Co.: Monroe, Aug. 16, 1899, *Pieters* (US). Montgomery Co.: Allegheny Springs, Aug. 10, 1898, *Mohr* (US). Princess Anne Co.: near Virginia Beach, *Kearney 2108* (US). Greenville Co.: Emporia, *Tidestrom 6902* (US). NORTH CAROLINA. Durham Co.: Durham, Aug. 18, 1931, *Blomquist* (Ph). Iredell Co.: Statesville, *Hyams* (US). Swain Co.: Swayney, Sept. 10, 1913, *Mooney* (US). Buncombe Co.: Biltmore, *Biltmore Herb. 403^b* (NY). Haywood Co.: Lake Junaluska, *Oosting 34403* (Ph). Cherokee Co.: Andrews, Sept., 1900, *Huger* (NY). SOUTH CAROLINA. Pickens Co.: Clemson College, *House 2885* (US). Oconee Co.: *Anderson 1537* (US). Charleston Co.: Santee Canal, Sept., ?, *Ravenel* (M). GEORGIA. De Kalb Co.: Stone Mountain, *Pennell 4042* (NY). Richmond Co.: Augusta, Oct. 2, 1898, *Cuthbert* (NY). FLORIDA. Citrus Co.: June-July, 1898, *A. S. Hitchcock* (M). Brevard Co.: Okeechobee region, *Fredholm 6014* (NY). Leon Co.: Tallahassee, *Nash 2519* (NY, US). ONTARIO. Kent Co.: Chatham, *Macoun 5898* and *24716* (NY).

MICHIGAN. Saint Clair Co.: Port Huron, *Dodge* 7 (US). Ingham Co.: East Lansing, Aug. 19, 1891, *C. F. Wheeler* (US). Van Buren Co.: South Haven, *Lansing* 3339 (US). Washtenaw Co.: 3 miles northwest of Ann Arbor, *Hermann* 9073 (NY). Wayne Co.: River Rouge south of Detroit, Aug. 17, 1916, *Chandler* (US). OHIO. Lorain Co.: Oberlin, Aug. 17, 1894, *Ricksecker* (US). Cuyahoga Co.: Berea, June, 1897, *Ashcroft* (US). Holmes Co.: Salt Creek Township, *Drushel* 9470 (US). Shelby Co.: Sept., 1904, *Clevenger* (US). Miami Co.: Fletcher, Aug. 20, 1897, *Clevenger* (US). Franklin Co.: Columbus, Oct. 24, 1898, *Clevenger* (US). Pickaway Co.: Circleville, Aug. 25, 1926, *Dreisbach* (Ph). Greene Co.: Jamestown, Sept., 1896, *Wooton* (US). Hamilton Co.: Cincinnati, Aug., ?, *Lea* (Ph). Scioto Co.: Friendship, *Demaree* 10809 (US). INDIANA. Marshall Co.: Lake Maxinkuckee, *Evermann* 1021 (US). Lake Co.: Gary, *Lansing* 4028 (Ph). Hamilton Co.: Mattsville, *Wilson* 27 (US). Clark Co.: Clarke, *Lansing* 4020 (Ph). Dubois Co.: 2 miles east of Clear Springs, *Deam* 26793 (Ph). Spencer Co.: 4 miles southwest of Chrisney, *Deam* 37495 (Ph). Warrick Co.: 2 miles southeast of Yankeetown, *Deam* 37598 (Ph). KENTUCKY. Franklin Co.: Frankfort, *Biltmore Herb.* 403^d (US). Scott Co.: Stamping Ground, *Singer* 353 (US). Fayette Co.: Lexington, *McFarland* 136 (Ph). Bell Co.: Aug. 15, 1888, *F. E. Lloyd* (NY). TENNESSEE. Carter Co.: Roan Mountain Station, *Rydberg* 8223 (NY). Coffee Co.: Tullahoma, *Biltmore Herb.* 403^a (US). Knox Co.: Knoxville, *Ruth* 2498 (NY). Davidson Co.: Nashville, *Svenson* 139 (G). Hamilton Co.: Chattanooga, *Lippincott* 98 (Ph). ALABAMA. Jefferson Co.: Birmingham, *H. E. Wheeler* 1207 (NY). Lee Co.: Auburn, *F. S. & E. S. Earle* 36 (G, US). Hale Co.: south of Rosemary, *Harper* 3246 (G, M, NY, US). Baldwin Co.: Tensaw, *Tracy* 9018 (NY, US). Mobile Co.: Mobile, Sept., 1892, *Mohr* (US). MISSISSIPPI. Tunica Co.: west of Dundee, *Anderson* 4479 (Ph). Warren Co.: Vicksburg, *Demaree* 14104 (M). Hinds Co.: Raymond, *Holt* 74 (US). WISCONSIN. Saint Croix Co.: Hudson, Sept. 1896, *Moyer* (US). ILLINOIS. Cook Co.: Chicago, *Lansing* 2780 (NY). Stark Co.: Wady Petra, Aug. 21, 1894, *V. H. Chase* (Ph, US). McLean Co.: Bloomington, *Robinson* in *Pl. Exs. Gray.* 229 (M, NY, Ph, US). Vermilion Co.: Catlin, *Lansing* 3494 (US). Richland Co.: near Olney, *Ridgway* 3260 (Ph). MINNESOTA. Hennepin Co.: Fort Snelling, *Mearns* 549 (US). Chippewa Co.: Myers, *Moyer* 2319 (Mi). Washington Co.: Lake St. Croix, Afton, Sept., 1919, *Butters* (Mi). Goodhue Co.: Red Wing, July, 1886, *Sandberg* (Mi). Scott Co.: Prior Lake, *Moyle* 2084 (Mi). Wabasha Co.: Lake City, *Manning* 3019 (Mi). Winona Co.: Dresbach, *Arthur* 79 (Mi). Houston Co.: Crooked Creek, *W. A. Wheeler* 336 (Mi). IOWA. Fayette Co.: *Fink* 451 (US). Marshall Co.: LaMoille to Mar-

shalltown, Aug. 21, 1927, *Lounsberry* (Ph). Johnson Co.: Coralville, *Somes 3569* (US). MISSOURI. Pike Co.: Aberdeen, *Davis 955* (US). Nodaway Co.: Burlington Junction, *Singleton 213* (Mo). Clay Co.: Randolph, *Mackenzie 380* (M). Jackson Co.: Eton, *Bush 7749* (US). St. Louis Co.: Allenton, Oct. 1, 1896, *Letterman* (M, Ph). Cole Co.: Osage, Oct. 15, 1900, *Norton* (M). Jefferson Co.: Kimmswick, *Wislizenus 377* (M). Miller Co.: Bagnell, *Trelease 880* (M). St. Francois Co.: Flat River, *Trelease 878* (M). Greene Co.: Sac River, *Trelease 877* (M). Jasper Co.: Joplin, *Trelease 874* (M). Barry Co.: Roaring River, *Trelease 1178* (M). McDonald Co.: Butler Creek, Noel, *E. J. Palmer 4261* (M). Taney Co.: Forsyth, *Trelease 873* (M). ARKANSAS. Carroll Co.: Oakgrove, *Bush 15918* (M). Benton Co.: *Bush 15743* (M). Crittenden Co.: West Memphis, *Demaree 11097* (M). Pulaski Co.: Pulaski Heights, Little Rock, *Demaree 8239* (M, US). Garland Co.: Hot Springs, *Runyon 1495* (US). Jefferson Co.: Bayou Bartholomew, *Demaree 13972* (M). Pike Co.: Murfreesboro, *Demaree 9430* (M). Howard Co.: Mineral Springs, *Demaree 9736* (M). Hempstead Co.: Fulton, *Bush 949* (M). Nevada Co.: 4 miles southeast of Prescott, *Hollister 81* (US). Miller Co.: Texarkana, *Demaree 13470* (M). LOUISIANA. Ouachita Co.: Bastrop, *Demaree 14116* (NY). Natchitoches Co.: Natchitoches, *E. J. Palmer 8729* (NY, US). Rapides Co.: near Alexandria, *Ball 405* (NY, US). Calcasieu Co.: near Lake Charles, *Allison 148* (NY). Orleans Co.: New Orleans, *Tracy 7429* (US). SOUTH DAKOTA. Clay Co.: Vermilion, *Visher 4103* (M). Bon Homme Co.: Running Water, Sept., 1892, *Thornber* (M). NEBRASKA. Knox Co.: Pishelville, *Clements 2751* (US). Saunders Co.: Ashland, July, 1888, *Williams* (US). Cass Co.: Weeping Water, June, 1887, *Williams* (US). Otoe Co.: Nebraska City, Oct. 14, 1900, *Hedgcock* (M). Saline Co.: Crete, *Dreisbach 6025* (Ph). Kearney Co.: Minden, Aug., 1892, *Milligan* (US). Nuckolls Co.: Aug., 1899, *Hedgcock* (M). KANSAS. Riley Co.: *Norton 473* (US, M). Osborne Co.: Osborne City, Sept. 2, 1894, *Shear* (US). Graham Co.: Bogue, *Imler 46* (M). Geary Co.: along Otter Creek, *Gates 18947* (M). Douglas Co.: Lawrence, July, ?, *W. C. Stevens* (US). Morris Co.: Dwight, Oct., 1900, *Norton* (M). OKLAHOMA. Kay Co.: near Ponca, *G. W. Stevens 1917½* (M, US). Grant Co.: near Lamont, *G. W. Stevens 1798* (M, US). Delaware Co.: *Bush 15733* (M). Payne Co.: Stillwater, *Waugh 381* (M). Oklahoma Co.: Oklahoma City, *Waugh 397* (US). TEXAS. Tarrant Co.: *Killian 6873* (US). Randall Co.: Palo Duro Canyon, *Ball 1259* (US). Denton Co.: *Graham 31* (US). Parker Co.: Weatherford, *Tracy 8119* (Ph, US). Dallas Co.: near Dallas, June–Sept., ?, *Reverchon* (M, Ph, US). Bowie Co.: Texarkana, *Heller 4190* (Ph, US). Taylor Co.: Abilene, *Tracy 7842* (G, M, Mo, NY, Ph, US). El Paso Co.: El

Paso, *M. E. Jones* 4174 (I, NY, US). Jeff Davis Co.: Musquiz Creek Canyon, *Sperry* T243 (US). Travis Co.: Austin, *Schulz* 720 (US). Montgomery Co.: Willis, Aug., ?, *Warner* (M). Gillespie Co.: Cherry Springs, *Jermy* (M). Val Verde Co.: 48 miles south of Ozona, *Ferris & Duncan* 3012 (M, NY). Kerr Co.: Kerrville, *Heller* 1922 (Ph, US). Austin Co.: Industry, *Wurzlow* 19 (US). Harris Co.: Houston, *Fisher* 607 (US). Bexar Co.: San Antonio, *Wilkinson* 56 (M). Comal Co.: Bracken, bed of Cibolo River, *Groth* 208 (US). Wharton Co.: Pierce, *Tracy* 7432 (US). CALIFORNIA. Placer Co.: Dutch Flat, *MacFadden* 12754 (NY, W). Tuolumne Co.: near Bear Creek, *Williamson* 242 (NY). Amador Co.: Middle Fork, *Hansen* 1216 (US). Butte Co.: east of Chico, *Heller* 11139 (F, G, NY, Ph, US). WASHINGTON. Skamania Co.: near Hood, *Suksdorf* 12327 (G, M, NY, Ph, US).

According to Thellung in a postal card of Feb. 6, 1916, filed at Gray Herbarium, Dr. E. Bonnet examined an authentic specimen of *E. nutans* in the Cosson herbarium at Paris and found it to be identical with *E. Preslii*. (How the identity of *E. Preslii* was ascertained is not explained.) Dr. Bonnet even communicated a fragment of the specimen in the Cosson herbarium to Thellung that he might judge for himself. However, Lagasca described his plant as "Caule . . . villosa" and Thellung verifies the fact and terms it "fortement poilue". Having satisfied himself that *E. nutans* and *E. Preslii* were identical and the type of *E. nutans* had villous stems, Thellung became concerned over the fact that Millspaugh had somewhere characterized *E. nutans* of the United States as glabrous. As a consequence Thellung decided that the plant of the United States differed from *E. nutans* and therefore required a new name which he proposed in the ambiguous manner quoted above near the end of the synonymy. A more confusing way of proposing a new name can hardly be imagined but is matched by "Gerbera (viridifolia var.?) Conrathii Thell., spec. vel var. nov." Vierteljahrsschrift der Naturf. Gesell. in Zurich 68: 454. 1923. Not only is the type of the new name practically impossible to determine but the position and rank of the new name are exceedingly uncertain. Nevertheless, the problem for me is fairly simple. I am satisfied that the plants known to American authors as either *E. Preslii* or *E. nutans* are *E. maculata* L. Consequently Thellung's new name is a synonym of *E. maculata*.

There is a specimen at F which probably represents the plant which Lagasca described as *E. nutans*. It bears the data: "ex antiquo herbario generali, Herbarium Horti Botanici Matritensis, *E. Preslii*, *E. nutans* Lag., in hort Madrid." The stems are pilose-tomentose on the young portions and subglabrate at maturity. This agrees with the observations of Thellung. It appears that *E. nutans* was based on unusually vestite plants of *E. maculata*.

The history of the misapplication of the name *E. maculata* L. to the small-leaved prostrate plant properly known as *E. supina* Raf. has been amply reviewed in Contr. Gray Herb. **127**: 74-76. 1939. Evidence that *E. hypericifolia* L. is properly applicable to a plant ranging from the West Indies and Mexico south to South America is presented, op. cit., 73-74, and Proc. Biol. Soc. Wash. **53**: 10. 1940.

14. EUPHORBIA VERMICULATA Raf., Amer. Monthly Mag. **2** (2): 119. 1817, op. cit., **2** (3): 206. 1818. TYPE not known to exist, "Found in August, 1816, near Sandyhill and Glen's Falls, state of New York in fields." House, N. Y. State Mus. Bull. **254**: 471. 1924.—*Xamesike vermiculata* (Raf.) Raf., Aut. Bot., 97. 1840.—*Chamaesyce vermiculata* (Raf.) House, N. Y. State Mus. Bull. **233-234**: 8. 1922.¹

E. hypericifolia L. ♂? *hirsuta* Torr., Comp. Fl. No. & Mid. States, 331. 1826, fully accepted in this category by Torrey, Fl. State N. Y. **2**: 176. 1843. TYPE: (NY?, not found). Perhaps reference to synonymy here is erroneous since Torrey, l. c., 1843, states "capsules even, sometimes pubescent." As applied here the capsules are always glabrous.—*E. hirsuta* (Torr.) Wiegand, Bot. Gaz. **24**: 50, Pl. III. 1897 (July); Robinson & Fernald, Gray's New Man. Bot. ed. 7, 546. 1908. *E. Rafinesquii* Greene, Pittonia **3**: 207. 1897 (Sept.).—*Chamaesyce Rafinesquii* (Greene) Arthur, Torreyia **11**: 260. 1912 (Jan.)² Heller, Muhlenbergia **8**: 48. 1912 (Apr.); Small in Britton & Brown, Illus. Fl. ed. 2, **2**: 467. 1913.

Chamaesyce Rothrockii Millsp., Field Mus. Pub. Bot. **2**: 376. 1913. TYPE: Camp Crittenden, Santa Cruz Co., Arizona, Sept., 1874, J. T. Rothrock 672 (F 197499!; photographs G!, W!; ISOTYPE M!). Intergrade between *E. vermiculata* and *E. maculata*.

Annual; stems prostrate to suberect, sparsely pilose, few to several from the base, 8-40 cm. long, 0.5-1.5 mm. thick, inter-

¹ Title-page date 1921, but cited by House, N. Y. State Mus. Bull. **254**: 471. 1924, as 1922 and received at Gray Herb. Feb. 24, 1922.

² Date of issue fide Torreyia **12**: 1. 1912.

nodes up to 6 cm. long, mostly 1–2 cm. long; leaf-blades ovate to lanceolate, 5–15 or sometimes 19 cm. long, upper surface glabrous or very sparsely pilose, lower surface more or less pilose especially toward the base, margin serrulate; petioles ca. 1 mm. long; stipules distinct or united, up to 1 mm. long, ciliate or glabrous, margin fimbriate to divided into a few linear segments; cyathia solitary at the nodes or the uppermost terminal in the bifurcations of the small leafy cyme; peduncles 0.5–2 mm. long, glabrous; involucre glabrous outside, sparsely pubescent inside on the bases of the lobes and stipes, obconical to obconical-campanulate, tapering to the peduncle, 0.7–1 mm. in diam.; lobes triangular, slightly exceeding the glands, the distal mostly entire, the proximal often with erect linear teeth; glands long-stipitate, circular to broadly transversely elliptical, 0.2–0.3 mm. in diam.; appendages white, glabrous, to 0.6 mm. long, entire or bluntly toothed; fifth gland linear, ca. $\frac{2}{3}$ as long as the lobes; sinus U-shaped, slightly depressed; bracteoles forming a slender segment below each gland, united to the involucre below, entire or with two to four filiform glabrous or sparsely hairy divisions above; staminate flowers 5–15 per cyathium; androphores glabrous, 1–1.1 mm. long; gynophore glabrous, exserted and mostly reflexed; ovary glabrous, roundly 3-angled; styles ca. $\frac{2}{3}$ bifid, ca. 0.6 mm. long; capsule glabrous, broadly ovoid, wider below the equator, 1.6–1.9 mm. long; seeds quadrangular, 1.1–1.3 mm. long, 0.9–1 mm. tangentially, 0.7–0.9 mm. radially, radially ovate, ventral facets mostly slightly concave, dorsal facets plane to slightly convex, smoothish to slightly wrinkled, coat dark grayish brown or sometimes pale gray.—PLATE 656A.

Nova Scotia, New Brunswick and Quebec to Pennsylvania and New York, west to Ontario, Michigan and Ohio; also in British Columbia, Arizona, and New Mexico (MAP 41). Representative specimens seen: NOVA SCOTIA. Hants Co.: Windsor, *Fernald, Bartram & Long 24085* (G). Digby Co.: Weymouth, *Fernald, Bissell, Graves, Long & Linder 21756* (G). Cape Breton Co.: North Sydney, *Bissell & Linder 21757* (G). NEW BRUNSWICK. Victoria Co.: Aroostook Junction, Andover, *Fernald 1983* (G). QUEBEC. Bonaventure Co.: Matapedia, on ballast, July 10, 1904, *Collins & Fernald* (G). Megantic Co.: east of Black Lake, *Fernald & Jackson 12118* (G). Deux-Montagnes Co.: La Trappe, *Louis-Marie 198* (G). Longueuil Co.: shores of the St. Lawrence, *Marie-Victorin 1062* (G). D'Argenteuil Co.: Grenville, *Marie-Victorin & Rolland-Germain 34052* (G). Pontiac Co.: Fort-Coulonge, *Marie-Victorin, Rolland-Germain & Meilleur 43720* (G). ONTARIO: Kingston, Sept. 23, 1901, *Fowler* (G); Gananogue Junction, July 22, 1908, *Kennedy* (G); Minto bridge, Ottawa, *Macoun 87831* (G); Southampton, *Macoun 88079* (G). BRITISH COLUMBIA: Englishman's River, Parksville,

July, 1915, *Carter* (G). MAINE. Penobscot Co.: Bangor, *Fernald & Long 13996* (NE); Orono, Aug. 27, 1908, *Fernald* (NE). Kennebec Co.: near the Messalonskee, Oakland, Aug. 29, 1906, *Nye* (G); Winslow, *Fernald 2737* (G). Sagadahoc Co.: Topsham, *Furbish* (NE). Oxford Co.: Woodstock, 1887, *Parlin 52* (G); Bethel, 1897, *Furbish* (NE). Cumberland Co.: Portland, *Fernald, Long & Norton 13995* (NE). York Co.: York Beach, 1879, *Furbish* (NE). NEW HAMPSHIRE. Cheshire Co.: Hinsdale, *Raup & Weatherby in Pl. Exs. Gray. 565* (G, I, M, Mo, NE, NY); Hinsdale, *Robinson 578* (G, NE). Sullivan Co.: West Claremont, *Robinson 581* (G). Grafton Co.: Haverhill, *Pease 14469* (NE); Lebanon, *Kennedy 10* (G). Coös Co.: Randolph, *Pease 19128* (NE); Berlin, *A. H. Moore 44170* (G). VERMONT. Franklin Co.: Maquam Bay, Hog Island, *Pease 25345* (NE). Grand Isle Co.: Lake Champlain, Aug. 15, 1885, *Morong* (NE). Chittenden Co.: Essex Junction, *Blake 2033* (NE); Burlington, *Blake 1813* (NE). Addison Co.: Shoreham, *Pease 25316* (NE). Rutland Co.: Brandon, *Pease 23971* (NE); Rutland, *Eggleston 1565* (G); Brandon, *Kennedy 9* (G). Windham Co.: Vernon, *Robinson 97* (G, NE). Bennington Co.: Dorset, *Day 376* (G, NE). MASSACHUSETTS. Middlesex Co.: West Cambridge, Sept. 4, 1896, *Harris* (NE). Suffolk Co.: South Boston, Sept. 1, 1880, *Perkins* (NE). Worcester Co.: Harvard, *Pease & Hopkins 24006* (NE). Franklin Co.: Deerfield, *Day 87* (G). Hampshire Co.: Worthington, *Robinson 616* (G); Amherst, *Seymour 2009* (NE). Hampden Co.: Springfield, Aug. 19, 1914, *Andrews* (NE). Berkshire Co.: Adams, *Day 42* (G); Sheffield, Oct. 1, 1919, *Churchill* (NE); Pittsfield, Aug. 15, 1915, *Churchill* (NE). RHODE ISLAND. Providence Co.: Lincoln, Sept. 23, 1906, *Fernald* (G). CONNECTICUT. Windham Co.: Killingly, Aug. 23, 1908, *Knowlton* (NE). Hartford Co.: Southington, Aug. 12, 1897, *Bissell* (G). Litchfield Co.: Canaan, Aug. 19, 1910, *Woodward* (NE). New London Co.: New London, Aug. 23, 1899, *Graves* (G). New Haven Co.: Prospect, *Blewitt 848* (NE). Fairfield Co.: Stepney, *Eames 54* (G, NE). NEW YORK. Clinton Co.: Plattsburg, beach, Sept. 16, 1917, *Hunnewell* (G). St. Lawrence Co.: Canton, *Phelps 635* (G). Washington Co.: Big Hollow, Bakers Falls, Hudson Falls, Aug. 3, 1914, *Burnham* (G). Rensselaer Co.: Tomhannock reservoir, *House 10618* (G). Albany Co.: Hudson River, Albany, Sept. 10, 1910, *Burnham* (G). Chenango Co.: Oxford, July 10, 1884, *Coville* (US). Oswego Co.: Cooperstown, *Hunnewell 6876* (G). Oneida Co.: east of Utica, *Haberer 776* (G). Cayuga Co.: North Fair Haven, Sterling, sand bar of Lake Ontario, *Whetzel 12388* (G). Tompkins Co.: Ithaca, *Wiegand 755* (G). Schuyler Co.: Montour, *Wiegand 8408* (G). NEW JERSEY. Hunterdon Co.: southeast of Linvale, *Long 51421* (G). Ocean Co.: Lakewood, *Hunnewell 6977* (G). PENNSYLVANIA. Lancaster Co.: between